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EDITORIAL COMMENT

Eugenic Hypothesis B

Sir Francis Galton coined the term "eugenics" before modern genetics came to birth with the rediscovery of Mendel's experiments in 1900. In the intervening half century knowledge gained concerning heredity in many organisms including human beings has been phenomenal. Yet that day Galton looked forward to, when eugenics would sweep the world like a new religion, is still far in the future.

Genetic research permits no doubt that Galton was right. Along with improvements in medicine and education, should go the assurance that the inborn excellences of tomorrow's children average higher than those of today's children. If the inborn quality of the human breed in terms of its potential for mental and physical health should decline, all our efforts to ameliorate the conditions of human kind would in the end be mainly wasted. Humanity would then lose in each generation a fraction of the heritage from our evolutionary past which makes us most distinctively human.

There are several reasons why eugenics has failed to become the significant moral and social force Galton hoped it would. Partly this has been due to mistakes made by eugenists themselves: mistakes in focus and emphasis and even more in insight. There has been a failure to distinguish between the accident of birth into a particular social pattern and the genetic constitution of the unique individual human baby. Those who are born with a silver spoon in their mouths are not thereby assured of better than normal health or of superior mentality. In a highly heterozygous creature such as man, Galton's principle of regression toward the mean knows no class barriers. Enthusiasm for eugenics has more than once degenerated into nothing more hopeful or inspiring than a plea for social snobbery. This has furnished ammunition for the enemies of eugenics—the super-egalitarians who, in spite of the evidence of their senses, hold that every baby is exactly as well endowed as every other baby. Some of the proponents of this strange dogma have been, strangely enough, geneticists. Nor has the naive belief that the mental and muscular training of the parents contributes anything to the excellence of their children gained experimental support. The child of the gifted mathematician or musician is likely to resemble its parents because the parents' unusual qualities had a genetic component. E. G. Conklin was right: Wooden heads are, alas, inherited. Wooden legs are not. The ability to profit by training is all that is transmitted.

What is the mechanism which produces change in the genic make-up of populations? Current genetical theory envisions the evolution process as based fundamentally on seven biological vectors: 1) genetic characteristics are transmitted by discrete heredity-units, the genes. These are inherited independently. In populations, as distinct from pedigrees, even the phenomenon of linkage does not introduce an exception to this principle. 2) New alleles are constantly being created at a slow rate by mutations of individual genes. The great majority of these mutations not only fail to contribute to the fitness of the organism in the heterozygote; many of them when homozygous are grossly debilitating or actually lethal in existing environments, and perhaps in most—or all—environ-

ments. 3) There is a constant selective sifting of less adapted and less viable genotypes by reason of their failure to reproduce (negative selection) and by a constant buildup of adapted genotypes by reason of their enhanced chances of survival to reproduction. The principal selective "sieve" of the evolutionary process is thus differential mortality. "Survival of the fittest" means in terms of evolution mechanics mainly one thing: survival to reproduce viable offspring. 4) Success in the struggle for survival is continuously being altered by changes in environment. 5) The phenomenon of genetic drift may alter the "gene-pool" of small isolated populations. During many generations this produces different strains and races. 6) Migration and cross-breeding by increasing variability will offer a wider range of genotypes for selection to act on. 7) Without effective selection eventual deterioration of any adapted species is inevitable by a reason of the buildup of non-adaptive mutant genes. This principle is illustrated in parasitism, where an organ not exposed to selection deteriorates or disappears.

Galtonian eugenics envisioned the enhancement of the inborn qualities of future generations through forces under social control. There is no question that forces under social control do affect the inborn quality of future generations, for better or for worse. Whether such forces are positive or negative in their effect—whether they enhance or debase the quality of the human breed becomes increasingly important as the chances of survival improve. For with a rising rate of survival, death selection obviously becomes increasingly less effective. The hope of eugenics is that birth selection can be substituted for death selection. The evidence from plant and animal experiments is that genotypic birth selection can be extremely effective. If—and this is the *big if*—selective control of natality is adequately applied. How this is to be done in the context of a human society with a high degree of individual freedom of choice is indeed the sixty-four dollar eugenic question.

Today the impact of social forces is producing some effects which are the reverse of eugenic. Achievement—which in varied contexts represents an ability to respond effectively to many different stimuli—definitely does not bring as one of its inevitable rewards a large brood of children. Rather the reverse. There is no reason whatever to believe that the over-reproduction of those who have demonstrated no notable ability is calculated to enhance the inborn qualities of tomorrow's children. If this differential birth rate is not actually deteriorating the heritage of tomorrow at a slow but indeterminate pace, it could only be that the principles of Mendel's genetics do not apply to human beings. And there is no evidence that our species has some kind of a miraculous dispensation relieving it from what appears to be a universal law of life.

Nor is this the whole story. Selection can be negative as well as positive. A striking example of this was reported by Reed and Palm, who found that in certain midwestern states individuals inheriting the dominant gene for Huntington's chorea had considerably larger progenies than their siblings who did not happen to carry the gene. Few would seriously maintain that a larger proportion of choreics would be advantageous. Yet if Reed and Palm have noted a general trend, that is what we are getting.

To be effective as a selective force, a eugenic program must effectively harness "forces under social control" to favor the reproduction of "superior" genotypes and to discourage the reproduction of "inferior" genotypes. This must, of course, be done in a context of free will. (The definition of "superior" and "inferior" presents so many problems that it cannot be explored here. In terms of evolution dynamics, "superior" means essentially "better adapted"; and "inferior" means the reverse. In a human social context, the added difficulties of defining "adapted" or "superior" are obvious.)

There appears to be a serious question as to the extent to which the "Eugenic Hypothesis"[1] fits into the genetic and selective evolutionary field of reference. The most formidable difficulty is perhaps the assumption that "group inheritance"—a transmission *en bloc*—of a whole constellation of desirable characteristics is a biological possibility. The block of desirable characteristics assumed to constitute a sort of "super-gene" in the Eugenic Hypothesis includes: (1) philoprogenetiveness, (2) good health, both mental and physical, (3) better-than-average intelligence and emotional stability, (4) a sense of moral duty and responsibility, etc. This assumption violates at least three of the basic postulates of the evolution process outlined above. The most important of these barriers is that genetic qualities are independently inherited as discrete units. There is no instance known to this writer of correlated groups of genes, which pass as a unit from one generation to the next in a heterozygous population. Nor would one gene be expected to display such an impressive pleiotropy. If the population is homozygous for the many genes which contribute to such a syndrome, there is no problem. And as long as the homozygosity is maintained, there is no need for eugenics. Hence operationally and theoretically this basic assumption is highly moot. Data from human community studies, sometimes cited as supporting the Eugenic Hypothesis, are doubtfully valid.

If this assumption that a complex-of-virtues, homozygously inherited, does not hold, then the argument that philoprogenetiveness will automatically select the best-endowed parents for the next generation lacks support. Even a casual exploration of the world about us should strengthen our doubts that such a force is operating.

There is a further hard-to-define Lamarckian flavor to the Eugenic Hypothesis that seems to run counter to biological realities. That this is a "social Lamarckianism" rather than a biological Lamarckianism really makes no difference in the end. The assumption appears to be that by hook or crook the postulated congeries of social and eugenic virtues somehow gets into the germ plasm.

Such considerations raise the question whether in the light of the genetic realities, the Eugenic Hypothesis may actually prove to be anti-eugenic. The Hypothesis invites an "escalator" philosophy which demands very little in the way of individual participation. Since the "right people" are assumed almost automatically to be the ones who *want* the big families, there appears to be really no fundamental problem of harnessing Galton's "social forces." Yet nothing known today about the evolution process gives any basis for believing that the human species has a ticket to Utopia.

If the Eugenic Hypothesis fails in the realism of its approach, are alternate hypotheses possible which do fit the genetic realities, and which might command effective motivations to make birth selection an effective eugenic force in a context of free individual choice? As a point of departure an alternative hypothesis — let us call it "Eugenic Hypothesis B"—is suggested. It bases fundamentally on the assumption that there is one quality which is almost universal in the human species. Whether this quality is conditioned by one gene or many is immaterial. That it is part of our biological heritage can hardly be doubted, any more than we can doubt that the five-fingered, five-toed, mammalian hand and foot is genetically conditioned. This postulate avoids the difficulty of *en bloc* inheritance discussed above for it assumes the virtual homozygosity of the species with respect to the underlying gene-complex sculpturing the character in question. There are many instances of such virtually homozygous gene complexes characteristic of existing species and genera. The universal human heritage postulated as the basic assumption in "Eugenic Hypothesis B" is the supreme desire built into virtually all women to bear perfect children, without physi-

[1]Proposed by Frederick Osborn, *Eugenical News*, Vol. XXXVI, No. 2, Vol. XXXVII, No. 1.

cal or mental spot or blemish. Many obstetricians testify to the deepness and universality of this desire. Overwhelmingly the first question a parturient woman asks is not: "is it a boy or a girl?" It is: "is the baby *perfect*?" All else is secondary.

"Eugenic Hypothesis B" holds that granting the validity of this basic assumption, the way is open to motivate a positive and effective eugenic program. Eugenics ceases to be a form of social Pollyannaism, and becomes a matter of personal choice and participation. Given an adequate dissemination of the A.B.C.'s of genetic knowledge, there is reason to believe that this drive for reproductive perfection may overshadow the more generalized philoprogenetiveness which often goes misty-eyed over the young of our canine and feline distant cousins. This is not the same thing — though perhaps related to that deep-seated yen for perfection.

Let us face the realities of birth selection as an eugenic instrument. It means a complete reorientation of human reproduction. It means high levels of reproduction by the biologically elite (a group which current knowledge does not yet permit us to define altogether adequately). It means non —or minimal reproduction—on the part of more than a majority of females. And this decision in a free society obviously must be voluntary. For motivation of this part of an eugenic program, Hypothesis B goes to the New Testament: to the Parable of the Talents. And to Matthew 22:14 — "for many are called but few chosen."

"Eugenic Hypothesis B" holds that the built-in mandate of perfection in procreation is urgent enough to stimulate philoprogenetiveness where it is in the context of the future, and to reduce it where it is not. Only a motivation of such urgency is significant in so surpassing a context. To bring such a motivation into being in the lives of men and women, more knowledge is needed, and a wider and a more vivid and humane dissemination of the knowledge we now have and of that to be garnered next year and next generation.

Eugenic progress therefore emerges as an extraordinarily complex and difficult field of human endeavor. Since eugenics deals with human births, with conception and death, it is in the center of one of the most highly charged areas of emotional stress in human experience and action. All of the repressed tensions and confusions which Sigmund Freud has revealed in his studies of the subconscious have an impact on the ability of every human being to think rationally and dispassionately about subjects such as eugenics. This aspect of the problem has been explored recently, in a somewhat different context, by Professor J. S. Flugel, in his fascinating "Population, Psychology and Peace," a book which demands the earnest consideration of all eugenists.

Professor Flugel points out that as control of human reproduction becomes more general, human life will become more valuable. With balanced population, Dr. Flugel hopes, it will be recognized that "parenthood is a worthy occupation, one which is at least as great a service to the community as many others which in the past have been more highly honored. . . . This control [over birth and death], assuredly one of the most momentous discoveries in history, will make us realize the true significance and import of Ruskin's dictum (which in an overcrowded world seems so strange and startling): 'There is no wealth but life.'"

It is the conservation and enhancement of this basis of all wealth that is the central problem of eugenics. The ultimate eugenic hypothesis should boldly affirm that the real meaning of this reality must be made clear to all human beings—clear enough for the most elemental decisions. When that philosophy becomes a motivating force in guiding human destiny, then the sense of guilt and fear and frustration which today makes any realistic progress toward peace and prosperity for all seem almost a travesty, may indeed be banished from the earth.

ROBERT C. COOK.

PRESENT STATUS OF RESEARCH ON POPULATIONS

Their Structure, Composition and Quality[1]

FRANK LORIMER
The American University

THE WORDS "STRUCTURE," "COMPOSITION," "quality," and "characteristics" are used rather loosely in describing demographic phenonmena. Sometimes these words are used interchangeably; at other times a particular term is used in a special sense, but even so its precise significance is not always clear. For example, in reports on the 1930 and earlier censuses, data were presented on "Composition and Characteristics." The same kinds of data are now presented simply as "Characteristics." The Bureau of the Census now gives no explicit recognition to the concepts symbolized by the terms "structure," "composition," or "quality." One might rashly conclude that either the Census must be derelict in its duty or that I have been ensnared into legerdemain with obsolete concepts. But there is good reason to take a more charitable position, both as regards the performance of the Census Bureau and as regards the wisdom of those responsible for drafting the present program.

"Structure," if used with restraint and precision in reference to a population, seems to me to be a nice word. It has a distinct significance that is important in demography, though it has no proper place in census operations. Apart from the effects of migration, a population can be conceived as a purely biological phenomenon. Members are added by birth and lost by death. But birth is merely an incident in the process of conception, gestation, and maturation—which also involves differentiation by sex—and death is normally a culmination of senescence. Each person at any time has a particular position with respect to these biological processes. The relative numbers of persons in these different positions are determined by previous vital rates and these relative numbers are functionally related to future vital rates. Lotka, therefore, had good reason for referring to the biologically determined age-and-sex composition of a *closed* population by a distinct term, *i.e.*, "structure." Semantic confusion could be reduced by strict adherence to this limited usage.

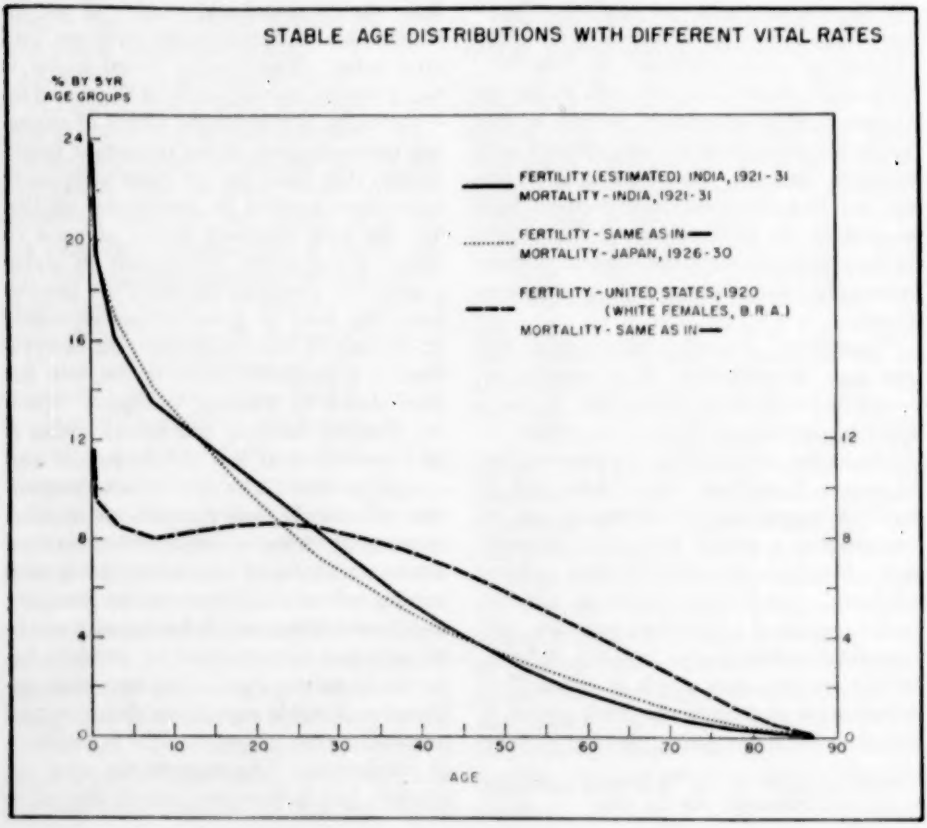
The essence of Lotka's unique contribution was the systematic analysis of the interrelations of demographic structure and vital rates. This line of investigation is being carried on and needs to be carried on —especially as regards the effects of changing rates—because it has important implications that have not yet been adequately taken into account in population studies. We are now painfully aware of ways in which a too direct application of stable population functions to empirical populations can lead to gross errors—especially in the case of inferences based on observations at a particular point in time—as has been shown by Karmel, Whelpton, Woofter, Vincent, Stolnitz, and others. Man is an animal, but he is a mobile animal and a social animal. The age and sex composition of many human populations deviates appreciably from a biological structure, due to the effects of migration. Moreover, human behavior is influenced by changing social conditions, and behavior at particular ages may be influenced by previous behavior at earlier ages. The uncritical application of stable population theory to real populations can, therefore, lead to irrational conclusions. This suggests the need for caution, but it does not impair the value

[1]Paper presented to the Population Association of America, Princeton, May 21, 1955.

of analytical theory or critical applications of this theory.

The influence of *fertility* on age distribution has received special attention in some recent studies. The persistent but fallacious notion that changes in age distribution are largely due to changes in mortality has two sources. (1) The effects of postponement of death in extending the lives of individuals is a common observation, whereas the effect on a population of changes in the size of successive birth cohorts is less obvious. (2) Demographers have sometimes been misled in contemplating life-table populations which explicitly represent given levels of mortality, forgetting that they implicitly involve corresponding levels of fertility. Experimentation with stable populations shows that their age structures are determined mainly by levels of fertility. In other words, assuming constant rates, *similar age structures* result from combining different sets of age-specific *death rates* with a given set of fertility rates; but very *different age structures* result from combining different levels of *fertility* with a given set of age-specific death rates. This is illustrated in the Chart below.

Similar results are obtained by experimenting with the effects of progressive changes in vital rates on the age structures of initially stable populations. *A decline of mortality,* in conformity with an observed age-incidence pattern, sometimes increases *slightly* the proportions of children and of aged persons in relation to numbers of adults in the middle age range, thus pro-



ducing a slightly *less* efficient age structure; but changes in mortality usually have little over-all effect on age structure. On the other hand, a progressive reduction of *fertility* tends to reduce the ratio of children to adults in the middle age range and also to increase proportions in advanced age classes.

Incidentally, it may be noted that the influence of age composition on the crude death rate is sometimes misinterpreted. For example, the crude death rate of the U.S. population, 1939–41, was 10.8 per thousand, whereas the general death rate in the corresponding life table was 15.7 per thousand. Such a difference is sometimes interpreted as showing the influence of an "abnormal" age distribution at this time, with the implication that if age-specific death rates remain constant the crude death rate must rise. But in a stable population with the 1939–41 age-specific death rates of the United States and with a constant increase of 1 per cent per year, the general death rate would be only 11.9 per thousand; a slightly higher constant rate of increase gives a general rate as low as the observed crude rate. One can not, therefore, assume that under present conditions crude death rates will necessarily rise.

My own experimentation in this field, reported in the UN *Population Bulletin*, has been on a rather elementary level. I have experimented with a few selected schedules of fertility and mortality. I am happy to report that the subject has been treated analytically in an investigation by Ansley J. Coale. His findings will be published in the near future in an article on "The Effects of Changes in Mortality and Fertility on Age Composition." These findings, in general, confirm my expectations; but they are more securely grounded and his findings have a general significance that my experiments could not insure.

The investigation of changes in the *sex composition* of populations, subsequent to the distribution of births by sex, affords relatively smooth sailing for demographers. The investigation of changing sex ratios among aged persons has properly received much attention by scientists concerned with social security programs and the whole field of gerontology. The widening of sex differentials in mortality, discussed by Dorn, raises many important problems.

Attention has been directed to the investigation of erratic deviations in apparent sex ratios at successive ages. Grauman has proposed a measure of such deviations in an index of errors in census reports. Incidentally, the thesis that such deviations can generally be attributed to the perversity of females in statements on this delicate subject received a rather severe blow in the study of U.S. census data recently published in the *Journal of the American Statistical Association*.

The problem of the determination of sex ratios at birth remains, so far as I am aware, shrouded in mystery. Probably the most important contribution to this subject during the last decade is Tietze's finding, reported in *Human Biology*, 1948, that the sex ratio in some 6,000 embryos, 3 to 7 months after conception, in the Carnegie Institution's collection was only about 108 males per 100 females, whereas sex ratios in the vicinity of 130 males per 100 females have generally been reported for late stillborn fetuses. It is certain that, among embryos at an early stage of gestation, there is a marked excess of males—contrary to expectation on genetic theory. Various hypotheses have been advanced to account for this apparent anomaly; but there seems to be no decisive evidence in support of any one explanation. In this context, I note that Spiegelman has provided useful ammunition for the defense of demographers against those who insist that God generally supports military activity by providing a surplus of male infants in the event of war.

The most important recent contribution to information on the *composition* and *characteristics* of our population has been the refinement of census procedures in obtaining data on such critical characteristics

as employment and unemployment, family composition, education, mobility, and income. The wealth and accuracy of such data now available to the demographer is of a quite different order from that provided 20 years ago. This must be credited in part to the competence of the census staff, but in part it must be attributed to the force of interests more potent than demography in legislative circles. Fortunately economic, social, and hygienic data are also demographic data. Therefore, the volume of information on the "characteristics" of populations rises with the growth and diversification of technology and social interests.

The concept of the "composition" of a population is essentially heuristic; its content is always relevant to some particular inquiry. Populations can be classified in all sorts of ways for different purposes: residence, income, occupation, education, race, religion, politics, membership in associations, body build, food preferences, etc. The variations treated in such classifications are real, but they are generally complex, continuous, and overlapping. Classification usually involves the selection of some more or less arbitrary criteria; and different criteria are useful in different investigations.

Two types of classification have very general relevance to population studies: classification by sex and age, and classification by area and type of community. In describing empirical populations, as regards the first of these categories, it is preferable to speak first of their "sex and age composition"—reserving the term "structure" for analytical treatments. Classification by area and type of community defines one kind of population components, but it is convenient here to refer to the distribution of population. Research involving such classification is reviewed in this series by Donald Bogue.

Apart from these two modes of classification, no other system of defining the composition of populations seems to be peculiarly relevant to demography. Apparently, the utility of classification by race or ethnic origin is diminishing; but classification by characteristics associated with social status may be increasing in importance. The latter was found to be very useful in dealing with data from the Indianapolis study on factors affecting fertility—though, in this case, within a universe limited with respect to area, race, and religion. The classification of populations into component parts is a basic procedure in social research. As information on the characteristics of populations is provided, or can be obtained, the student delineates patterns of composition to fit his particular interests. In this sense, the interests of demographers are similar to those of other social scientists. Demographic research has progressed in recent years by becoming more specific. This promotes more accurate, though more limited, generalizations.

Spengler deals with interrelations in the economic sphere between the changes in population components and changes in economic functions. I will merely add two incidental comments to his systematic treatment. In a recent conference in Washington called by Resources for the Future, Joseph Davis suggested that the incidence of recent increases of income in different segments of our population may have appreciably affected total consumption trends in this country, notably the rather surprising increase in the proportion of the national income spent for food. This suggests one aspect of the relation of behavior patterns to population components. Another approach takes account of such changes as the shift of population from scattered rural communities to metropolitan areas and the diminished force of rural-urban differentials in fertility. These demographic trends influence changes in total national income, and in distribution of the national income.

Demographers have *special responsibility* for investigating the influence of population changes on the characteristics of populations. This responsibility is recognized in the statutes of the Population Association

of America and in the statutes of the International Union for the Scientific Study of Population which refer to studies on the *qualitative aspects* of population. Statements about the qualitative aspects of population may have any of three rather different meanings, which may be roughly defined as "narrow," "broad," or "loose." The narrow usage refers to the relation of population changes to some particular kind of characteristics, as for example, genetic characteristics. The broad usage deals with the relation of population changes to all sorts of characteristics, including genetics, but also including the economic relations mentioned above, and various social, cultural, and personal characteristics. This is the sense in which the phrase has been used in Swedish population theory. It needs to be sharply distinguished from what may be called a "loose" usage, from the standpoint of demography, where one is concerned with various characteristics quite apart from their relation to population trends. This is a very proper interest, but it lies outside the field of demography.

Interest in the relation of population trends to genetic characteristics is the joint province of demographers and geneticists, as their studies bear on the special field of eugenics. This subject merits special emphasis because of its profound importance for the future of mankind, its elusive character, and the absence of support by any special interest groups.

All thoughtful people today are aware that we face the possibility of catastrophic changes in this sphere that might operate with a devastating rapidity of a quite different order from the possible gradual changes with which Galton was concerned. The possibility of large-scale genetic mutations due to the effects of radiation is a frightening prospect, but it is a subject on which there are wide differences of opinion among competent geneticists—and, in any case, it is a subject to which we as demographers can make no special contribution.

Much progress has been made by human geneticists in recent years in identifying genetic factors in various diseases and disabilities—as well as in blood groups and one unique capacity for taste—and identification in some cases of the carriers of recessive genes for particular disabilities through indications of incomplete penetrance. For the most part, these findings call for individual attention by physicians and genetic consultants. They do not present problems of general concern to demographers. The most important effect of current population trends in the western world on the incidence of such diseases is probably to reduce their phenotypic frequency, in the case of diseases due to recessive genes. This follows from the break-up of isolated, inter-bred groups, due to increased residential and social mobility.

There seems to have been rather little advance in recent years in knowledge about genetic factors in intelligence and personality. It may be that progress in the analysis of factors in psychological performance, investigations of the physiological processes involved in such behavior, and studies on genetic factors affecting animal behavior are contributing background information that will make possible more rapid advances in this field in the near future. But until we have such knowledge, we must maintain an open mind to alternative hypotheses. Work of immediate importance of the qualitative aspects of population must now be framed chiefly with reference to social factors affecting health and personality.

The most important contribution in recent years to knowledge about the relation of differential reproduction to the *distribution of intelligence* has come from the extensive survey of eleven-year old children in Scotland in 1947, as a sequel to a comparable survey in 1932. The data from these surveys have been carefully analyzed by James Maxwell and other British psychologists. Relations between ratings on group tests and on individual tests, size of family, order of birth, occupational sta-

tus, residence, and migration have been taken critically into account. The interrelations observed among intelligence scores, size of family, and occupational status are similar to those generally reported from studies in this country. These relations lead to the inference that differential reproduction has exercised a depressing influence on the trend of the mean level of intelligence in Scottish children. On the contrary, the investigation shows that in 1947 the mean scores on group tests were somewhat higher, and on individual tests practically the same, as in 1932. This finding is somewhat reassuring on any reasonable interpretation. It proves that *if* the differential reproduction characteristic of Great Britain and the United States has exerted a depressing influence on national levels of intelligence, this influence has been offset by other tendencies toward a general rise in intelligence. The hypothesis that increased heterosis (genetic heterogeneity) has been a positive factor can not be wholly excluded; but evidence in support of this hypothesis is very inconclusive. A more plausible hypothesis may be that changes in general level of living, educational practices, parent-child relations, and the intellectual stimuli provided by urban life have favored improved performance on intelligence tests. A possible alternative interpretation would be that inferences concerning the depressing effect of differential reproduction on intelligence are false. One explanation sometimes advanced is that there may have been no significant relation between the intelligence of parents and the size of their families, but that the observed negative association between the test scores of children and size of family can be attributed wholly to the depressing effect of large family size, as such, especially at lower economic levels. These alternatives can, and should be, tested. My tentative judgment is that the last hypothesis in its extreme form is probably false, but it may well account for part of the observed associations—at least in some situations. I have never interpreted the assumed depressing effect of the usual differential reproduction in purely genetic terms, but I have assumed that it probably involves a genetic component. This possibility is not excluded by the findings of the Scottish surveys.

Mr. Maxwell's own conclusion, in his paper at the World Population Conference last year, is as follows:

> The positive contribution of surveys such as the Scottish ones is to reveal the nature and extent of the problems rather than to find conclusive answers to them, and to provide a framework of reference for more limited but more intensive investigations. Such investigations could profitably be directed to the elaboration of more precise methods of handling sociological and genetic data, to the establishment in greater detail of the interaction of social and genetic factors in fertility and intelligence, and, as the Scottish Mental Survey is doing with the 1215 individually tested children, trying to ascertain the bearing of intelligence test score, family size and social conditions on the future lives of the children. The main need, however, is to establish a link between one generation and the next. Neither extensive surveys nor limited investigations are themselves alone sufficient, the two approaches are necessarily complementary to each other.

In the field of education, our institutions today are confronted with a great influx of entrants from homes with meager educational experience. This is indicative of accelerated social mobility, and it provides an opportunity for extending the benefits of higher education; but it also creates problems in educational policy. These problems have been intensified by the negative association during previous decades between educational attainment and fertility. If liberal education has any positive values its influence must affect child development and personality formation, and its effects may be cumulative through successive generations. This long-term influence will obviously be more potent if the association of fertility with educational levels is positive rather than negative.

Another very interesting line of qualitative population study, developed mainly by Glick, is the analysis of changes in the life cycle of families. Demographers have long been interested in the influence of patterns of family life on population trends; the influence of changes in population on family living deserves more attention than it has received. There is need for more effective rapport in planning research between students of the family and students of population trends. Perhaps, as the trend toward voluntary parenthood becomes widespread, it may promote the transmission of cultural values associated with family life. No properly controlled data are now available on this subject, but it should receive attention in research on social and psychological factors in fertility.

It must be recognized that we are moving here toward very complex problems involving demography, sociology, and psychology —or, perhaps we had better say, in the broad field of social research. This includes the relation of population trends to attitude formation, values, and behavior—including special problems in political behavior, delinquency, and mental disease.

The most brilliant recent contribution to knowledge about the characteristics of the American people is not primarily concerned with the relation of these characteristics to demographic trends, but it does include some data on this subject. I refer to Stouffer's *Communism, Conformity, and Civil Liberties.* This is indeed a rare product—so competent in social theory and technique and so clearly and simply presented, so dispassionate and yet so imaginative. Stouffer takes great pains to emphasize the point that this study is concerned only with the measurement of tolerance with respect to a particular issue. But this issue by its nature involves large attitude constellations, and it is less immediately associated with the special interests of any large groups than such issues as labor relations or race relations. Relative tolerance as measured in this study shows a strong positive association with educational level and a strong negative relation with age, jointly and independently. Stouffer notes that the area distribution suggests a positive correlation between geographical mobility and tolerance in this field. The area distribution also suggests to me a negative correlation between fertility during the previous decades and tolerance in this field.

With respect to the United States, the qualitative aspects of population changes are now more important and more interesting, in my judgment, than questions relating to the trend of the total number. I conclude by expressing the hope that some of the younger members of our Association may approach elusive problems in this field with such imagination and skill as that employed by Stouffer and his associates in their treatment of another critical and elusive subject.

INDUCED ABORTION IN JAPAN
Under Eugenic Protection Law of 1948

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Introduction

PERHAPS ONE OF THE most striking demographic phenomena in the world today is the use of induced abortion as a technique of family planning by over a million Japanese women annually. This situation is of special interest to the demographer and to the medical man because of the large amount of detailed research conducted by Japanese scholars. Seldom, if ever, has it been possible to obtain so comprehensive a view of abortion in a given society.

In this article, an attempt has been made to present, in summary form, the reasons for, characteristics of, and implications of the widespread use of abortion in postwar Japan. Also, a rather complete listing has been made of material readily available in English, in the hope that it may stimulate and aid further research on the topic.

Historical Background

It would seem that consciously exercised fertility control has been a feature of Japanese civilization since very early times. Down through the years, abortion, infanticide and contraception have been used in varying degrees by large segments of the population.

The first known use of abortion in Japan dates from approximately 700 A.D. Shortly before the start of the Tokugawa Shogunate (1603–1867), definite traces of abortion and infanticide can be found. During these early times, their incidence seems to have been sporadic and localized, related as it was to such natural calamities as plagues, floods, droughts and famines, which occasioned temporary population-resource problems. By the mid-eighteenth century, however, these practices had become widespread and permanent, so much so that in 1767 the shogunate deemed it necessary to issue an official edict prohibiting both abortion and infanticide.[1]

The adverse economic conditions in which a majority of the Japanese lived generally are considered to have occasioned the use of such drastic means of fertility control. Over and above the natural difficulties of subsistence, the people were burdened with a stringent system of taxation prevalent in feudal Japan. Significantly, the word *mabiki*, used to signify infanticide, has as its original meaning the thinning out of excess plants in a rice paddy. Thus, the Japanese "thinned out" some children in excess of the means of subsistence.

During the Meiji Restoration Period (1868–1912), a number of factors helped bring about a decline in the amount of abortion and infanticide. Among these were industrialization, higher standards of living, the influence of Western culture and again, official government opposition. The Restoration government, like its Tokugawa predecessor, took both positive and negative measures to remedy the situation. Especially important were its efforts to create a cultural milieu wherein large numbers of offspring would be considered desirable.[2]

This is not to say that abortion and infanticide disappeared completely. Haruo Mizushima, arguing from fertility trends of the latter half of the nineteenth century, and from present-day sex ratios of terminal births to women in the upper child-bearing

[1] G. B. Sansom, *Japan: A Short Cultural History*, New York: Appleton-Century, 1931, p. 555.

[2] Irene B. Taeuber and Marshall C. Balfour, M.D., "The Control of Fertility in Japan," in *Approaches to Problems of High Fertility in Agrarian Societies*, New York: Milbank Memorial Fund, 1952, pp. 103–104.

ages, concludes that these practices continued not only during the Meiji period, but even down to the present.[3]

The urban-rural fertility differential for Japan during the years 1880-1940 shows tendencies which cannot be explained except by postulating a large amount of fertility control in the rural areas. For, while the urban crude birth rates declined during this period, the rural rates showed a steady increase. Some of the increase can be accounted for by steadily improving birth registration among rural inhabitants, but by no means all of it. Mizushima concludes that infanticide must have been more prevalent in rural districts during earlier times, and that this practice gradually subsided allowing for an increase in the crude birth rates. It would seem just as reasonable to conclude that abortion also was widespread during the period.

Examining sex ratios of terminal births to women in the upper child-bearing ages for the years 1947–49, Mizushima finds that the sex ratio is positively correlated to the age of the mother and family size, and that the ratio is in general abnormally high. The only reasonable explanation would seem to be that some Japanese couples were expressing their traditional preference for male offspring by the intentional elimination of female children after birth.

After 1920, Japanese fertility began to decline steadily. The relative importance of various factors in this decline can only be surmised. however. Statistics on the production and diffusion of contraceptives, although incomplete, would seem to indicate the limited role played by this method of control.[4] Official stillbirth rates for the years 1920–40, unusually high as they were, suggest the continued use of abortion. And, as has been seen, infanticide was not abandoned entirely.[5] Other factors which deserve consideration were the postponement of marriage and the shortage of men due to military or industrial service.

With the rise of militarism in Japan, official policy was geared to the building up of a large and healthy population, a sort of "super race." The National Eugenic Law of 1940, a concrete expression of this pronatalist policy, condemned abortion and infanticide except in cases where they were used with the express purpose of preventing the birth of defective offspring. Also, the reported production and sale of contraceptives for civilian use dropped sharply during this period.

Thus, direct evidence and analysis of official vital statistics indicate that abortion, contraception and infanticide were in use as means of family limitation in the years

TABLE 1
NUMBER OF STILLBIRTHS[1] AND STILLBIRTH RATIOS IN JAPAN
1935-1953

Year	Number	Ratio[2]
1935	115,592	53.2
1936	111,050	53.2
1937	111,481	51.5
1938	99,527	52.1
1939	98,347	52.1
1940	102,033	48.6
1941	103,393	45.7
1942	95,446	43.1
1943	92,882	41.5
1944	—	—
1945	—	—
1946	80,262	42.1
1947	123,837	46.2
1948	143,963	53.7
1949	192,677	71.5
1950	216,979	92.8
1951	217,231	101.6
1952[3]	203,687	101.9
1953[3]	193,116	103.7

[1]In Japan fetal deaths occurring after the third month of gestation are classified as "stillbirths." Before completion of the third month the classification is "abortion."

[2]Ratio = Number of stillbirths per 1,000 live births.

[3]Preliminary figures.

Source: *U.N. Demographic Yearbook*, and Division of Health and Welfare Statistics, Japanese Ministry of Welfare.

[3]Haruo Mizushima, "The Trends of Fertility in Japan," Paper presented at the World Population Conference, Rome, September, 1954.

[4]Taeuber and Balfour, *op. cit.*, pp 113-115. See also Tatsuo Honda, "Extent of Diffusion of Fertility Control in Japan," presented at World Population Conference, Rome, September, 1954.

[5]Cf. Table 1, "Number of Stillbirths and Stillbirth Ratios in Japan, 1935–53."

prior to World War II. Unfortunately, the total amount of such limitation in the Japanese population, and the relative importance of each method employed, cannot be measured with accuracy.

This historical background is essential to an understanding of the present situation in Japan, since it illustrates that the use of abortion by the Japanese is not something only recently added to their culture, but that it has been a permanent feature of long standing.

Cultural Background

Analysis of the situation in postwar Japan is rendered particularly difficult by the presence there of attitudes and values hard for the average Westerner to understand.

When the Japanese speak of abortion as being "immoral," they do not necessarily include in that term all aspects usually taken into consideration by Americans. Neither Shinto nor Buddhism, the two largest religious creeds in Japan, categorically oppose abortion. And Shinto does not even recognize the child as a living person until it has "seen the light of day." Thus, the abhorrence of abortion based on the idea that it is in reality murder (and hence gravely sinful) is generally less strong among non-Westernized Japanese than among many other peoples.[6]

As a result, the Japanese tend to make a lesser distinction between abortion and other means of family limitation than do Westerners generally. They are not so likely to exclude instinctively and categorically the former as an acceptable means of family planning.

This attitude has been strengthened by language used in literature circulated throughout Japan. In some advertisements for chemical contraceptive products and in some family-planning advertisements in mass-circulation women's magazines, the character meaning "birth limitation" conveys the idea of "abortion" and/or "contraception." This leads to misunderstandings. In a 1950 public opinion poll, it was found that over 90 per cent of the women interviewed had at best only a vague notion as to the difference between the character for "contraception" specifically and that for "birth limitation" in general. Almost 50 per cent simply did not know there was a difference.[7]

Against this background, the passage of the Eugenics Protection Law, the official designation and special training of physicians to perform the operations, the controversy over family planning in the press, and the widespread advertising of chemical contraceptives contributed greatly toward a rather extensive acceptance of induced abortion as a means of family planning.

A survey conducted by the *Mainichi* newspaper is often cited to indicate the general attitude of Japanese toward abortion. Of those interviewed 38.6 per cent approved abortion in cases of financial distress; 18 per cent in cases where contraception had failed. The percentage of approval was higher where medical or eugenic indications were cited. On the other hand, opposition to the practice of abortion was voiced by 8.2 per cent for fear of moral degradation, and by only 2.9 per cent for religious reasons.[8]

There are signs that the reluctance among Japanese women to have an abortion may be diminishing. One indication of this is seen in the fact that the month of pregnancy during which the operation is most frequently performed has gradually become earlier.

Still one should not conclude that Japanese women are resorting to abortion glad-

[6]Even those aspects of Shinto and Buddhism which might tend toward moderation in this matter have little influence on personal behavior. Many of the Japanese religious adherents are so for traditional reasons, and place little importance on religion in their daily lives. For a further discussion of Japanese ideas on the morality of abortion, see below.

[7]Taeuber and Balfour, *op. cit.*, p. 111.

[8]"Public Opinion on Population Control," *Planned Parenthood Quarterly of Japan*, I (April-June, 1950), 31-32. This report contains, in summary form, the results of a poll taken by the *Mainichi* newspaper's Population Problem Research Council.

ly or without remorse. The fact is that they consider delivery the natural course and regard abortion and contraception as unnatural. In many cases, however, harsh economic conditions have proven stronger than natural inclinations and desires.

An indication of the women's attitudes, cited by Dr. Koya, is the fact that many of them were found to have concealed their true identity during their investigation by government commissions assigned to review abortion cases. He interprets this as a sign of the reluctance and shame with which Japanese women are resorting to abortion.[9]

Postwar Economic Problems

In the years immediately following World War II, Japan entered a period of economic crisis. As a result of the war and subsequent settlements, she found her economy severely disrupted, and the rebuilding of it greatly hampered.

Geographically, she had lost 44 per cent of her prewar empire, including the highly industrialized area of Manchuria. Restrictions placed on the fishing area available to her caused a decline in output of this essential foodstuff, a staple in the Japanese diet. The resentments and ill will remaining from wartime conflict stood in the way of her establishing satisfactory trade relations with many nations of the world, especially her Asian neighbors and trading partners. In short, Japan's economic position simply was precarious for a number of years immediately following the close of World War II. Even today, it is far from satisfactory.

Population Increase

Intensifying an already serious economic problem were rounds of unprecedented population growth that Japan was experiencing. The repatriation of civilian and military Japanese nationals during the years 1945–50 accounted for a sudden influx of approximately 6 million people into Japan proper. During this same period, the country went through the usual postwar "baby boom." Crude birth rates climbed to 34.3 per 1,000 in 1947 and 33.5 per 1,000 in 1948, almost equalling the highest recorded rate in the nation's history of 35.0 per 1,000 in 1920–24.

Simultaneously factors were at work which caused an abrupt drop in the crude death rate. The hardships incurred by the civilian population during the war years had the result of eliminating many older and weaker persons. Thus, not a few died during that time who normally would have lived a few more years, and whose deaths would have been reflected statistically in

TABLE 2

CRUDE BIRTH AND DEATH RATES AND RATES OF NATURAL INCREASE IN JAPAN
1920-1954

Year	Crude Birth Rate	Crude Death Rate	Rate of Natural Increase
1920–24[1]	35.0	23.0	12.0
1925–29[1]	34.0	19.8	14.2
1930	32.4	18.2	14.2
1931	32.2	19.0	13.2
1932	32.9	17.7	15.2
1933	31.5	17.7	13.8
1934	30.0	18.1	11.9
1935	31.7	16.8	14.9
1936	30.0	17.5	12.5
1937	30.8	17.0	13.8
1938	27.1	17.7	9.4
1939	26.6	17.8	8.8
1940	29.4	16.4	13.0
1941	31.1	15.7	15.4
1942	30.3	15.8	14.5
1943	30.3	16.3	14.0
1944	29.2	17.4	11.8
1945	23.2	29.2	—6.0
1946	25.3	17.6	7.7
1947	34.3	14.6	19.7
1948	33.5	12.0	21.5
1949	33.0	11.6	21.4
1950	28.1	10.9	17.2
1951	25.5	10.0	15.5
1952	23.3	8.9	14.4
1953	21.4	8.8	12.6
1954	19.4[2]	7.8[2]	11.6[2]

[1]Five-year averages.
[2]Estimate based on January-May rate.
Source: *U.N. Demographic Yearbook*, and Population Research Institute, Japanese Ministry of Welfare.

[9]Yoshio Koya and Minoru Muramatsu, "A Survey of Health and Demographic Aspects of Induced Abortion in Japan—Special Report No. 1," *Bulletin of the Institute of Public Health*, III (June, 1953), p. 13.

the death rates for the years after the war. Even more important were the medical and public health measures introduced by the occupation authorities, which contributed significantly toward raising the general health level of the Japanese people. Insecticides, pesticides and miracle drugs found their way into Japan in large quantities. As a result, in 1947 the crude death rate reached an all time low of 12.0 per 1,000 persons.

The rate of natural increase, whose previous high had been in the order of 15.0 per 1,000 climbed to 19.7 in 1947 and to 21.5 in 1948. The rate of population growth for the five-year period 1945–50 was 16.5 per cent as compared with 7.5 per cent for 1935–40 and 8.5 per cent for 1925–30.

This high rate of population growth might well have been absorbed by a nation with room to expand or with a healthy industrial economy. As it happened, Japan had neither, and soon found herself faced with a rather acute population–resources problem.

The Eugenic Protection Law

Concern over the effects that poor economic conditions were having on the health and welfare of the mothers of Japan led to the passage, in July 1948, of the Eugenic Protection Law. The widespread backing given to this law is indicated by the fact that, among the nine legislators introducing it, all five major political parties were represented. After its original passage, it was revised on several occasions.

As amended in May 1949, the law included the following provisions which, generally speaking, were designed to prevent the increase of inferior descendants and to "protect the life and health of the mother as well."[10]

First, the law legalized sterilization in cases where defective offspring might result, or where the life or health of the mother might be endangered by delivery or pregnancy. The sterilization operation could be voluntary or, in some cases, could be ordered by state authorities.

Second, "Eugenic Protection Consultation Offices" were erected to provide advice and information on matters of marriage, eugenics and family limitation by means of contraception.

The *third* provision, and that which concerns us here, relates to abortion, or "artificial interruption of pregnancy" as it is called in Japan.

The original law, as of July, 1948, named reasons of eugenics or of health of the mother as sufficient to justify an abortion.[11] It was stated that in case a physician (approved by the Japanese Medical Association) found it "necessary" to perform an abortion for any of the reasons enumerated, he could "with the consent of the person in question and spouse" apply to a commission for authorization to do so.

A May 1952 amendment, however, made it unnecessary for the doctor to consult any authorities before performing an abortion. The matter was left entirely to his discretion.[12]

An abortion was also allowed if the woman had conceived under threat of violence, or if, in the case of a married woman, she had been forced into extramarital relations against her will.

In May 1949, a number of liberalizing amendments were passed. The most significant among them provided that financial or socio-economic conditions of the couple in question could be sufficient to justify an abortion. As will be seen later, the majority of reported abortions have been performed under this provision, rather than under those pertaining to eugenic or health considerations.

[10]For the provisions of the Eugenic Protection Law, cf. Taeuber and Balfour, *op. cit.*, p. 116, and for more detail, "The New Eugenic Protection Law in Japan," *Eugenical News*, XXXIII (March-June, 1948), 21–23.

[11]A complete list of these indications is given in "The New Eugenic Protection Law in Japan," p. 21.

[12]Unfortunately, this amendment will render future research in the field more difficult inasmuch as statistical data will be less complete and less reliable.

TABLE 3
REPORTED INDUCED ABORTIONS IN JAPAN BY REASON AND METHOD OF AUTHORIZATION
1949–1954

Year	At the Discretion of the Physician				With the Approval of the Eugenic Protection Commission				Total
	Hereditary Diseases	*Leprosy*	*Maternity Protection*	*Sub-Total*	*Mental Diseases*	*Maternity Protection*	*Rape*	*Sub-Total*	
1949	1,882	711	142,428	145,021	856	98,619	1,608	101,083	246,104
1950	3,594	640	164,727	168,961	767	317,141	2,242	321,150	489,111
1951	2,537	349	176,707	179,593	628	457,059	1,070	458,757	638,350
1952	7,081	1,328	787,232	795,641	•	•	1,304	2,552*	798,193
1953	4,684	803	1,060,106	1,065,593	•	•	1,183	2,473*	1,068,066
1954[1]	1,734	548	585,970	588,252	•	•	316	774	589,026

•Category not applicable after May, 1952 when approval by the Commission was declared unnecessary.
*Includes unspecified cases: 1,248 in 1952; 1,290 in 1953; 458 in January-June, 1954.
[1]Totals for January-June, 1954.
Source: Division of Health and Welfare Statistics, Japanese Ministry of Welfare.

It can be said that the Eugenic Protection Law is extremely permissive. Many would agree with the conclusion that "The general effect of the law would seem to be first, to permit legal sterilization or abortion in almost any case for almost any reason if the patient desired it . . ."[13]

SCAP and the Eugenic Protection Law

The question has been raised as to the role of SCAP in the passage and administration of the 1948 law. Since opinions differ greatly and since evidence is somewhat scarce, it is rather hard to make any definitive statements on the subject. However, it would seem that American occupation officials, at least in their official capacity, did not try to prevent or promote the passage of the bill or the use of abortion. Considering the problem one to be handled by the Japanese themselves, American personnel generally adopted a policy of "hands off."[14]

[13]"The New Eugenic Protection Law in Japan," p. 23. A similar opinion was expressed by Dr. Minoru Muramatsu in some untitled remarks made before Meeting No. 8 of the World Population Conference, September 2, 1954.

[14]For conflicting points of view on this subject, cf. George P. Garlin, "America's Modest Proposal," *Commonweal*, LX (July 9, 1954), 339ff.; Patrick O'Connor, "Birth Control in Japan," a letter to the editor of the *Tablet* (London), XCIX (March 29, 1952), 254, and Fumiko Y. Amano, "Abortion in Japan: Significance of its Legalization," *Planned Parenthood Quarterly of Japan*, I (April-June, 1950), p. 26.

General Effects of the Law

It now seems that, even among those originally in favor of the Eugenic Protection Law, not a few have been disturbed by the drastic results it occasioned. Apparently, many of these at the time considered it a mere recognition and legalization of a *fait accompli*. They hoped to regulate abortion by government control until such time as it could be eliminated or minimized by widespread family planning or by alleviation of the poor economic conditions. By formal regulation, they thought, harmful effects associated with criminal, clandestine abortions would be overcome. And as the title implies, and the body of the law states explicitly, the use of abortion for purposes of health and eugenics was foremost in the minds of many. There is no evidence to indicate that more than a small minority considered a rise in the incidence of abortion in Japan a desirable thing.

Nevertheless, since passage of the law in 1948, the number of induced abortions has risen steadily and rapidly. In January, 1949, there were 6,400 such operations reported; the total for that year of 264,100 indicates the rapid rate of increase. Latest figures show that for 1953 the total of reported induced abortions was 1,068,066. Table 3 gives a statistical summary of the use of abortion in Japan for the years 1949–54. As is the case with all abortion statistics

these are quite inadequate, since the number of unreported and criminal abortions is still quite large. Many consider the true total to be at least twice the reported figure.[15]

It is evident, then, that the Eugenic Protection Law, far from being a mere recognition of an existing situation, has, in combination with other factors given rise to an enormous increase in the incidence of induced abortion in Japan.

Reasons Cited for the Use of Abortion

From the various studies made of the situation recently, a number of interesting and significant facts have emerged. But, one stands out above all, namely, that women of Japan are using abortion as another means of family planning, and that eugenic and health considerations have not been foremost in their minds.

Although the law was designed to protect the life and health of the mother and to insure healthy offspring, the number having abortions for these reasons has been quite small. A study, conducted by Dr. Koya and his associates, of 1,382 cases among married women showed that only 17.1 per cent had had the operation for health reasons. Only six mentioned "eugenic" considerations as having influenced their decision to have abortion. The reasons most frequently named were "mainly for spacing," "mainly for economic reasons" and "mainly do not want more children."[16]

Thus, over 80 per cent of the women in this group based their reasons for having an abortion on factors identical with those used to justify other methods of birth control, that is, financial need, child spacing and the desire to limit family size.

Joban Coal Mine Study

Similar conclusions can be drawn from a study made by Dr. Koya in the Joban coal mining area of the Fukushima prefecture.[17] Beginning in February of 1953, miners and their wives were subjected to rather intensive guidance in family planning. The aim of research was to determine the most effective way in which lower income groups could be persuaded to utilize contraceptives. That particular segment of the population was chosen because it has always been characterized by high fertility, and because Dr. Koya felt that its problems seemed to typify those of the nation as a whole.

The method of guidance was as follows. Members of the National Institute of Public Health made periodic visits for a number of days at a time, giving lectures, showing movies, distributing literature and giving individual advice where possible. To carry on during the absence of Institute officials, a midwife was appointed in the area for the express purpose of continuing family planning guidance. Leaders from local women's clubs were also used for this work. Aside from technical advice given on fertility limitation methods, there was a constant effort to impress on the couples involved the "desirability" of effective family planning, and "how unfortunate it

[15]Although some of the increase reflected in statistical data is attributable to improved reporting, nevertheless it is safe to say the total number of induced abortions in Japan has actually risen. The Japan Institute of Public Health, in what it regards as rather conservative estimates, places the total number of reported and unreported induced abortions for the years 1952 and 1953 at possibly as high as 1,940,000 and 2,330,000 respectively. In this connection, cf. Minoru Muramatsu and Hiroshi Ogino, "Estimation of the Total Numbers of Induced Abortions as Well as of Sterilization Operations for Females in Japan for the Years 1952 and 1953," *Bulletin of the Institute of Public Health*, IV (Sept., 1954).

[16]Yoshio Koya *et al.*, "Preliminary Report of a Survey of Health and Demographic Aspects of Induced Abortion in Japan," *Archives of the Population Association of Japan*, II (1953), pp. 6–7. In a separate analysis of the 37 women who were childless at the time of the operation, 24 cases (65 per cent) indicated reasons of health. These represent but a small part of the total sample, however, and in no way vitiate our conclusion.

[17]Yoshio Koya, M.D., Director, National Institute of Public Health, gives an account of this survey in "Present Situation of Family Planning among Farmers and Coal Mine Workers," a paper presented at the World Population Conference, Rome, September, 1954, and in "A Study of Family-planning of Coal-Miners," an unpublished paper prepared by Dr. Koya and staff.

would be . . . if couples have too many children."[18]

The results of this study (as well as earlier studies made by Dr. Koya and his staff[19]) would indicate that, following contraceptive guidance, induced abortion increased significantly. And, as Dr. Koya testifies, "the decrease in births appearing after a period of approximately one year . . . was largely caused by artificial abortions."[20]

The reason for this seems to be that although the women involved considered family planning desirable, they had not adopted the attitudes of the Institute of Public Health with regard to the various means of attaining this end. The Institute of Public Health favored contraception, but frowned on abortion as an unsuitable and harmful method; the people made no such clear-cut distinction. Their final choice in any individual case seems to have been based on purely personal motives, not on the advice of public health officials. In general, however, abortion and contraception probably were used as substitutes for one another. Thus, contraceptive failures were followed by abortion, and repeated abortions often lead to contraception, or in some cases sterilization.

Evidence at hand fails to indicate that moral or health considerations are having much influence on choice of method. Convenience seems to have played a major role. As Dr. Koya points out, ". . . thus they resort to surgical treatment unhesitatingly avoiding troublesome contraceptive practices."[21]

[18]Koya, "A Study of Family-planning," p. 7.

[19]Koya, "Present Situation," pp. 2-4. See also Koya, "Three Rural Villages with Birth Control Guidance," *Planned Parenthood Quarterly of Japan*, III (Oct.-Dec., 1952), pp. 40–41. These describe a similar study made in a rural milieu.

[20]Koya, "A Study of Family-planning," pp. 10–11. Recent reports from the same areas indicate, however, that after two years the incidence of induced abortion showed a gradual decline.

[21]*Ibid.*, p. 12.

Differential Between Contraceptors and Non-contraceptors

In a national survey it was found that by and large those who resort to abortion are more often contraceptors than non-contraceptors. Looking at this same fact from two aspects it was seen that: (1) contraceptors have experienced abortion more than have non-contraceptors; (2) for the country as a whole, pregnancies resulting from contraceptive failure were terminated by abortion in at least 50 per cent of the cases.[22]

With regard to the first point, the statistics in more detail are as follows: of those couples classified as contraceptors, 31.5 per cent had experienced abortion; 53.8 per cent had not. In 14.7 per cent of the cases, the experience was not determined. Among non-contraceptors, only 4.8 per cent had experienced abortion; 83.2 per cent had not, while 12 per cent of the cases were not determined. From this it might be argued that abortion is approximately 6 times more frequent among contraceptors than among non-contraceptors.

Secondly, the above-mentioned survey determined the outcome of pregnancies resulting from contraceptive failures. For the country as a whole, 50.0 per cent of such pregnancies were terminated by induced abortion. For urban regions the figure was 56.3 per cent; for rural regions, 44.1 per cent.

Abortion and Family Size

From the studies Dr. Koya made of a small sample group of women who had experienced induced abortion, he concluded that the highest incidence of abortion in Japan today is found among women of the 30–40 age group and among women with 2 or 3 children.[23] Related to this is the fact that high-order births have decreased significantly in recent years. An examination

[22]Honda, "Extent of Diffusion of Fertility Control in Japan," p. 8.

[23]Koya, "A Study of Induced Abortion in Japan and Its Significance," *Milbank Memorial Fund Quarterly*, XXXII (July, 1954), pp. 285–287.

of the birth rates by order of birth for the years 1947 and 1951 shows that between these years the rate decreased substantially in every classification after the third birth. Moreover, the decrease was progressively larger with the higher order births.[24]

From these two facts, it can be concluded that many women are willing to have the second and even the third child, but after that point begin to limit the size of their families. To a large degree, this limitation has been accomplished by means of induced abortion.[25]

Cost of an Abortion Operation

In any attempt to explain the extensive use of abortion by the women of Japan, the cost of such an operation must be taken into consideration.

In the Joban coal mine survey, it was found that most of the women had the operation performed for as little as 700 yen (less than $2.00), by utilizing public and private health insurance programs available to much of organized labor in Japan. Moreover, in not a few cases, the employer had borne a substantial part of the cost.[26] In another survey of a less homogeneous group, the average cost was found to have been approximately 2,200 yen ($6.10).[27]

Obviously, such extremely low charges for an abortion operation have had the effect of putting this means of fertility control within reach of all but the poorest families.

Abortion and Population Growth

There are those who consider abortion a quite acceptable answer to Japan's current population-resource problems. Others look on it as a "necessary evil" at best. Most Japanese, however, have rejected it as a suitable solution in view of the many and grave difficulties involved. Some of these difficulties have been discussed below.

One of the most significant biological facts about abortion as a means of fertility limitation is the need for frequent repetitions. The resumption of the normal cyclical functions of the female seems to occur more quickly after an abortion than after a pregnancy carried to term. Generally speaking, re-conception is a distinct possibility within a shorter period of time than in the case of a normal delivery. Moreover, during lactation the possibility of conception is sometimes minimized. When these natural safeguards of the health of the mother and the child are rendered inoperative by an abortion, repeated pregnancies may well occur at rapid intervals.

Such has been the case in Japan. In Dr. Koya's survey of 1,382 women, it was found that 49.1 per cent were pregnant within two years after the operation. And, of the women pregnant again, 74.1 per cent had become so within one year. Almost half of this latter group resorted to a second abortion.[28] If, then, abortion were to be an effective means of population control, it would have to be repeated quite frequently by a large segment of the female population.

Recent Population Trends

Latest population statistics from Japan indicate a large drop in the crude birth rate for the year 1954. From 34.3 per 1,000 in 1947, the rate has dropped to 19.4 in 1954, a decrease of 43.4 per cent. In this same period, the rate of natural increase has fallen from 19.7 to 11.6 per 1,000. In view of the abnormally high birth rates in early postwar years, this decline is to some degree natural, that is, a return to normality. But, deliberate fertility control has been an equally important, if not more important, factor. Tatsuo Honda, estimating

[24] *1953 U.N. Demographic Yearbook.* The appreciable decrease in first births is due partly to the abnormally high rates in 1947, partly to the fact that fertility control is spreading rapidly in Japan.

[25] Honda, *op. cit.*, p. 9, estimates that the number of births prevented by contraception annually is but one-fourth the total prevented by all means. This estimate was based on the year 1952. Others estimate this percentage at 30 per cent and, attribute 70 per cent of birth prevention to induced abortion.

[26] Koya, "A Study of Family-planning," pp. 11–12.

[27] Koya *et al.*, *op. cit.*, p. 9.

[28] *Ibid.*, p 5.

TABLE 4
FUTURE POPULATION TRENDS OF JAPAN
1950-2015

Year	Total Population (millions)	Distribution by Age Groups (%) 0–14	15–59	over 60	Crude Birth Rate	Crude Death Rate	Rate of Natural Increase
1950	83.2	35	57	8	28.1	10.9	17.2
1955	89.1	33	59	8	20.4	9.1	11.3
1960	93.8	30	61	9	17.1	8.4	8.7
1965	97.3	25	65	10	15.5	8.5	7.1
1970	100.7	22	67	11	15.3	8.8	6.5
1975	103.9	21	67	12	15.2	9.6	5.6
1980	106.5	21	67	12	14.3	10.4	3.9
1985	108.0	20	66	13	13.0	11.1	1.9
1990	108.5	19	66	15	12.0	11.8	0.2
1995	108.0	18	65	17	11.5	12.9	—1.4
2000	107.0	17	64	19	11.4	14.0	—2.7
2005	105.2	17	62	22	11.3	15.4	—4.0
2010	102.7	17	59	24	11.1	16.7	—5.5
2015	99.6	17	58	25	10.9	17.8	—7.0

Source: Population Research Institute, Japanese Ministry of Welfare.

the relative importance of methods of birth control, concludes that ". . . of the total number of births prevented by various means, those prevented by contraception represent only one-fourth." He also is of the opinion that ". . . the recent decline of the birth rate is chiefly due to abortion."[29]

Projections made by the Population Research Institute of the Japanese Welfare Ministry indicate a continued lowering of the birth rate, and, after 1960, a rising death rate. In spite of present high levels of unemployment, there is some concern being voiced over the projected age structure of future Japanese populations, and the possibility of a shrinking (relatively speaking) labor force.[30]

Abortion and Health

Aside from the demographic effects of abortion, its influence has been seen in other areas.

Although the majority of induced abortion operations are performed by competent physicians under strict specified conditions, still, a considerable number of women report post-operative complications. In Dr. Koya's survey, an attempt was made to determine the extent of such harm. The results, however, must be interpreted in the light of certain limitations if a true picture is to be obtained, namely: (1) the information was gotten by means of personal interview, not by medical examination; (2) the interviews were conducted anywhere from 18 to 41 months after the operation, so that some difficulties may not have had time to become apparent, or some had disappeared and had been forgotten; (3) no account of phychic effects was taken.

In spite of these limitations, 47.3 per cent of the women reported some physical complaint. It may be significant, in view of what was said about need for repetition, that the rate of complications increased approximately 5 per cent with each succeeding operation.[31]

Abortion and Morality

When the Japanese refer to the "moral undesirability" or the "immorality" of abortion, they are not necessarily passing judgment on the intrinsic morality of the act. Rather, they often have in mind the extrinsic, harmful effects that the widespread use of abortion has on individuals and on society.

[29]Honda, *op. cit.*, pp. 7–9.

[30]Cf. Table 4, "Future Population Trends of Japan, 1950-2015."

[31]Koya, "A Study of Induced Abortion in Japan," pp. 11-12. See also Yoshio Koya and Minoru Muramatsu, "A Survey of Health and Demographic Aspects of Induced Abortion in Japan—Special Report No. 3," *Bulletin of Institute of Public Health*, IV (Sept., 1954), pp. 2–4.

TABLE 5
REPORTED STERILIZATION OPERATIONS IN JAPAN BY REASON AND METHOD OF AUTHORIZATION
1949-1954[1]

Year	At the Discretion of the Physician				With the Approval of the Eugenic Protection Commission	Mental Disease Patients	Total
	Hereditary Diseases	Leprosy	Maternity Protection	Sub-Total			
1949	167	97	5,356	5,620	132	—	5,752
1950	235	103	10,792	11,130	273	—	11,403
1951	237	107	15,409	15,753	480	—	16,233
1952	340	237	21,241	21,818	560	46	22,424
1953	344	116	31,162	31,622	832	98	32,552
1954[2]	125	72	19,210	19,407	446	73	19,926

[1]Approximately 1 per cent of these are male sterilization operations.
[2]Totals for January-June, 1954.
Source: Division of Health and Welfare Statistics, Japanese Ministry of Welfare.

One such effect, at present causing concern among the Japanese, is the use of abortion to terminate pregnancies resulting from illicit sex relations. There are indications that such use is rather extensive.

If the incidence of abortion is related to all women by age group, and then to married women by age group, the differences observed can be explained only by the assumption that abortion is used extensively by the unmarried.[32] Obviously, with one of the strongest deterrents to illicit sex relations removed, that is, the fear of detection, this type of behavior may well increase, especially among the youth of the country.

Some married couples are opposed to use of abortion on grounds that could be called "moral" in the sense explained above. The *Mainichi* public opinion poll previously mentioned, found that 8.2 per cent of the participants opposed abortion because of a "fear of moral degradation." This would seem to indicate that many Japanese couples consider as degrading the refusal to accept the parental responsibilities following on the use of marriage. Even amid harsh economic conditions, such couples apparently regard the use of sex exclusively for the sake of sex as somehow harmful to their character and to their moral worth.

[32]Taeuber and Balfour, *op. cit.*, p. 217. To what extent abortion was so used by the unmarried before passage of the Eugenics Protection Law is rather hard to say in the absence of reliable statistics for that period.

Sterilization

Up to the present, the number of sterilization operations performed in accordance with provisions of the Eugenic Protection Law has been relatively small, when compared with the number of abortions.[33] There are indications, however, that this form of fertility control may become much more prevalent in the near future.

In one of Dr. Koya's studies, the attitude of the women towards sterilization was determined. Of the 1,382 participants, 49.6 per cent did not want to be sterilized; 23.5 per cent either wanted the operation, or had already had it; 25.8 per cent were undecided; and approximately 1 per cent said that they had no need for the operation, for example, they were widowed or divorced.[34] From this, it would seem that perhaps 50 per cent of the women now experiencing abortion operations might under certain conditions decide to undergo sterilization.

Some comments made by Dr. Minoru Muramatsu at the World Population Conference hint that, because of the injurious results of repeated induced abortions now

[33]See Table 5, "Reported Sterilization Operations in Japan by Reason and Method of Authorization, 1949-54." For the most comprehensive discussion of sterilization in Japan, see "A Survey of Health and Demographic Aspects of Female Sterilization in Japan," an unpublished paper by Dr. Koya and his associates, distributed by the Institute of Public Health.

[34]Koya *et al.*, *op. cit.*, p. 5.

being observed, official and medical opinion may favor an increased use of sterilization as a remedy for the situation. His concluding remarks are especially interesting:

> Consequently, I believe that the role which female sterilization plays in the general picture of family limitation in Japan will undoubtedly become more and more significant. . . We are watching with keen eyes what is happening in Puerto Rico and other parts of the world.[35]

Conclusion

Admittedly, the legalization of induced abortion in Japan has contributed substantially to a lowering of the birth rate, thereby easing somewhat the pressures upon immediately available resources. But if in this respect it has mitigated a difficult situation, it provides no lasting or sound answer to a basic economic problem. In view of its restricted area and very limited agricultural land, Japan needs assured sources of raw materials and foodstuffs as well as outlets for its manufactured products.

Moreover, some are beginning to speculate as to the dangers of declining labor force and aging population inherent in so large and sudden a cut in the birth rate. Also occasions of justifiable concern are the injurious effects abortion seems to be having on the health, morals and general welfare of the people, individually and collectively considered. In short, the Japanese experiment with legalized abortion has left unsolved some basic problems, while adding new ones in the form of personal and social disorganization.

Other nations faced with problems associated with limited resources and rapid population growth have been watching with interest the drastic reduction of the Japanese birth rate consequent to the legalization of abortion for socio-economic indications. In view of this, it would seem to be of utmost importance that American students analyze the Japanese experience in all its aspects: social, ethical and economic, as well as medical and demographic.

[35]See the untitled remarks of Dr. Muramatsu to Meeting No. 8 of the World Population Conference, September 2, 1954.

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SOME ASPECTS OF THE GENETICS AND EVOLUTION OF MAN'S BEHAVIORAL CHARACTERISTICS*

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THERE PROBABLY ARE NO PROBLEMS more intriguing and perhaps none more important than those which pertain to the genetics and evolution of man's behavioral characteristics. Although no final answer can be given as yet to most of the suggested questions, it seems of interest from time to time to review a few of the facts which have been revealed relative to these problems and to consider some of their possible relationships and probable implications.

In this discussion I propose to deal only with broad aspects of the genetic and evolutionary problems of behavior. Hence I shall refer primarily to large subdivisions of behavioral characteristics rather than to specific patterns. The subdivisions which seemingly serve well this purpose are: (1) those behavioral variations which indicate mental deficiency or oligophrenia, (2) those which represent mental disorder, (3) those which fall within the "normal" range. I include within the third category those variations which represent special or superior mental capacities.

1. The lowest level of human mental deficiency that one can imagine is seemingly that of a human being completely lacking a brain. There are such individuals born. Fortunately they are rare and even more fortunately none survives birth, but they do exist or are alive for a period of time in utero. Hence, it appears proper to consider their behavior during this interval a valid representation of one form or type of mental deficiency.

What the factor or factors are which are responsible for the development of fetuses lacking a brain is not known with any degree of certainty. Their rarity, their early death and other reasons make a determination of their casual factors a very difficult one. However, on the basis of some indirect evidence, it appears probable that a variation in heredity may be the major causal factor in at least some instances. In other words, it appears probable that some of the acephalic or paracephalic fetuses which develop may represent variations in heredity which limit the expression of human behavior to the lowest degree imaginable. That hereditary factors exist which cause death at early developmental stages is well established.

Among the various types of mental deficiency which are exhibited by human individuals who possess a brain and survive birth, fairly many have been shown to have some hereditary basis. Of these, quite a few are clearly inherited in a relatively simple fashion, *i.e.*, are the result of a gene variation at a single chromosome locus. Some of these specifically inherited types have been given specific names. Of these we may mention at least one or more form of microcephalic idiocy, infantile and juvenile amaurotic idiocy, and phenylpyruvic oligophrenia. The last is nearly an ideal example of a human variation inherited in a simple manner. This specific defect was originally discovered by Fölling of Norway in 1934. The affected individuals show varying degrees of mental deficiency ranging from high imbecility to low idiocy and always have phenylpyruvic acid detectable in their urine. The variation has been investigated with respect to mode of inheritance by Fölling, Ruud, Penrose, Jervis,

*Extracts of a symposium paper read before the American Psychological Association, New York City, September 1954.

Munro, and others, and it has been demonstrated quite clearly to be the result of the action of a single autosomal recessive gene.

Of the many occurrences of mental deficiency which appear to be inherited in a relatively simple fashion but which have not been given a descriptive or specific name, the one reported by Allan, Herndon and Dudley (1944) is not only one of the most recently presented examples but also one of the most distinctive. The affected individuals are mentally deficient and show associated with it a type of muscle weakness. The syndrome is reported for 24 individuals appearing in six generations. As the authors suggest, the pedigree (Figure 1) seemingly warrants the conclusion that the syndrome is the result of the action of a single sex-linked recessive gene.

Much of the additional information which is at hand relative to the role of heredity in the occurrence of mental deficiency has been provided by a study of twins. At the University of Chicago we have been investigating twins over a period of years relative to abnormal as well as "normal" variations and from time to time have been asked to ascertain the zygosity and the mental age of a number of sets of twins whose parents or guardians considered their mentality to be below normal. The zygosity of these twin set is in each instance determined by using as criteria the A-B, M-N and Rh blood types. P T C taste reaction, finger and palm prints, and about ten other physical characteristics. In each of three instances the twin set brought in was shown to be monozygotic and the two members were found to score very low and almost identically on general intelligence tests. One pair, whose chronological age at the time of testing was 31, was of special interest in that each member was found to have a mental age of about six, but at the same time was found to score somewhat higher on a mirror tracing test than does the average American university student. This pair of twins was also of interest in that both members were, and had been from birth, allergic to cow's milk and some other foods.

The two most extensive twin studies reported in the literature which pertain specifically to mental deficiency are those of Rosanoff, Handy and Plessett (1937) and of Juda (1939).

Rosanoff and his co-workers located in the schools for the feeble-minded of California and some other states 366 pairs of twins of which at least one member was

INHERITANCE OF MENTAL DEFICIENCY

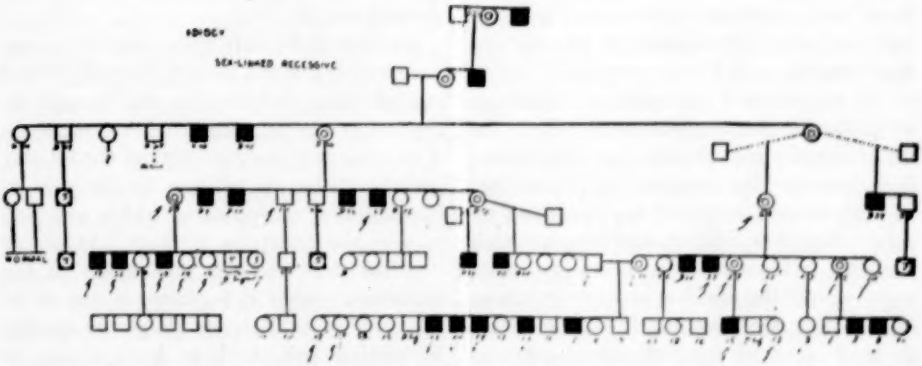

FIGURE 1. Pedigree Published by Allan, Herndon and Dudley showing inheritance of idiocy associated with a form of muscle weakness. The mode of inheritance of the syndrome appears to be that of a sex-linked recessive.

TABLE 1

CONCORDANCE PERCENTAGES OF MONOZYGOTIC AND DIZYGOTIC TWINS WITH RESPECT TO MENTAL DEFICIENCY

Investigator	Total No. Pairs	Monozygotic Total No.	Monozygotic Concordant No.	Monozygotic Concordant %	Dizygotic Total No.	Dizygotic Concordant No.	Dizygotic Concordant %
Rosanoff *et al*, 1937	366	126	115	91	240	128	53
Juda, 1939	273	71	69	97	202	83	41
Total	639	197	184	93	442	211	47

mentally deficient. Of the 366 pairs diagnosed for zygosity, 126 were shown to be monozygotic and 240 dizygotic. Among the 126 monozygotic sets, 115 pairs or 91 per cent were found to be concordant with respect to mental deficiency, whereas among the 240 dizygotic sets, 128 pairs or only 53 per cent were found to be concordant. (By concordance, as used here, is meant that the co-twin of a first-examined member of a twin pair was found to show the same variation as was exhibited by the first member.)

Juda, working in southeastern Germany, located 273 pairs of twins in which at least one member was mentally deficient. Of these 273 pairs, 71 were shown to be monozygotic and 202 dizygotic. Among the 71 monozygotic sets she found 69 or 97 per cent concordant with respect to mental deficiency, whereas among the 202 dizygotic sets she found 83 or only 41 per cent.

If we compare the results of these two extensive twin studies, pertaining specifically to mental deficiency, we note that their corresponding concordance percentages are strikingly similar. If we combine these results, as it seems permissible for us to do, we obtain a concordance percentage of 93 for the monozygotic pairs and 47 for the dizygotic sets (Table 1). The difference between the concordance percentages of both the separate and the combined results is highly significant, and together with available evidence in the literature seemingly permit the conclusion that variations in heredity are responsible for a major share of all occurrences of mental deficiency. No exact percentage may be given, but the evidence seems to indicate that it is well above 50 per cent. This statement takes into consideration the evidence that many instances of mental deficiency are the result of trauma, dietary deficiency and other environmental variations. It also takes into account what seems to be a fact, namely, that some individuals have been classified as being hereditarily mentally deficient who actually represented only a lack of educational opportunity.

2. Among the many behavioral variations which belong within the second or mental disorder category and which have been shown to have some hereditary basis, we may mention as generally accepted examples: Huntington's chorea, spino-cerebellar ataxia, and certain forms or occurrences of epilepsy. Relative to the dementias, such as schizophrenia and manic-depressive psychosis, which especially have been the subject of controversy, the answers may not be specific, but even in regard to these variations fairly conclusive evidence does appear to be accumulating in favor of a considerable degree of genetic determination.

Because of the wide variety and the many indefinitely defined mental disorders which are properly included in this second delimited group of behavioral variations, it is impossible to formulate more than a very general statement relative to the role of heredity and environment which will pertain to the group as a whole. About all that one may state is that many of the variations within this group, if not to be inherited in a relatively simple or specific Mendelian fashion, have been shown to have some hereditary basis.

3. We come now to a consideration of

the genetics of human behavioral variations which fall within the arbitrarily delimited "normal" range, including those which may be said to represent superior or special mental capacities.

Most of the genetic studies pertaining to behavioral variations within the "normal" range have been attempts to ascertain the relative contributions of heredity and environment to variations in intelligence as measured by general intelligence tests. Since the results of most of these studies, such as those of Barbara Burks (1928), Freeman, Holzinger and Mitchell (1928), Leahy (1935), and of Newman, Holzinger and Freeman (1937) are well known, I shall not review any of these studies here. I should like, however, to state that all or at least most of these studies appear to provide evidence that variations in heredity exist which contribute a small if not major share to the observed variations in intelligence as measured by general intelligence tests.

When psychologists began to apply factor analysis to behavioral variations and verified the existence of more or less distinct units or components of mental characteristics, new opportunities for genetic study seemed to have been opened up. At least it seemed of interest to the geneticist to test these units, no matter what they represented, for possible contributions of heredity to observed variations in their occurrence. A few years ago a joint study with Professor Thurstone was proposed and started at the University of Chicago while Professor Thurstone was still a member of the faculty. The object of the study was to compare the differences between the scores of the two members of monozygotic twin sets with those of dizygotic pairs relative to a large number of psychological tests, some of which presumably tested for certain components of intelligence.

A total of 142 pairs of same-sexed twins was located in the high schools of Chicago. Their mean age was found to be 14. Of this number 103 pairs were diagnosed unquestionably for zygosity. A-B, M-N, and Rh blood types, P T C taste reaction, finger and palm prints, and about ten other physical characteristics were used as criteria in the zygosity diagnoses. Of the 103 same-sexed twin pairs unquestionably diagnosed, 48 were found to be monozygotic and 55 dizygotic.

Prior to or completely independent of the zygosity determinations, the psychological tests were administered to the 103 pairs of twins. These tests, as Professor Thurstone has described them, consisted of "a diversified battery of 34 psychological tests which yielded 53 separate scores." Following the scoring of the tests, the difference between the scores of the two members of the dizygotic and of the two members of the monozygotic pairs was obtained relative to each of the 53 tests. It was found that large intrapair differences were shown by both types of twin pairs, but that the tails of the distributions of the dizygotic pairs were in general longer than were those for the monozygotic pairs. To determine whether the large intrapair differences relative to each psychological test were significantly more numerous for dizygotic than for monozygotic sets, a Chi-Square test was applied. A large difference was defined as one which fell beyond the 80th percentile of the combined results.

In Table 2 are shown for each of the 53 administered psychological tests the obtained Chi-Square value and its probability (P). Attention may be called to the fact that the first 13 of the 53 psychological tests are significant at the 1 per cent level and the first 23 at the 5 per cent level.

In a report from the University of North Carolina Psychometric Laboratory, of which Professor Thurstone is the director and at which the latest portions of the statistical analyses were carried out, Professor Thurstone writes as follows: "It is natural to inquire whether these psychological tests that show the best differentiation between identical and fraternal twins have something in common as regards psychological content or nature." He gives a partial answer to

TABLE 2

THE PROBABILITY (P) THAT LARGE INTRAPAIR DIFFERENCES IN TEST SCORES OF FRATERNAL AND IDENTICAL TWINS ARE SAMPLES OF THE SAME POPULATION (THURSTONE-STRANDSKOV)

Test No.	Test Name	Chi-Square Values	P
1	Koh's Block-Arthur	14.3753	.00005
2	P.M.A.-Space	14.3753	.00005
3	Stroop—Gard B-Time	13.1569	.00013
4	Stroop—Gard C-Time	13.1569	.00013
5	P.M.A.-Verbal	12.9261	.00015
6	Dynamometer-Right Hand	10.1854	.0007
7	Street Completion	10.1396	.0007
8	Tapping-Left Hand	8.5084	.0018
9	Telegraph Key-Right Hand	7.3333	.0033
10	Two-hand Coordination-Left Hand	6.6912	.0049
11	P.M.A.-Word Fluency	5.2460	.0110
12	Minnesota-Left Hand	5.2085	.0113
13	Spiral After-Movement-Time	5.0657	.0123
14	Stroop—Card A-Time	4.2690	.0195
15	P.M.A.—Memory-First Names	4.0902	.0217
16	Mutilated Words	4.0827	.0218
17	Spelling	3.6393	.0283
18	Hidden Pictures	3.5617	.0297
19	Two-Hand Coordination R+L	3.4496	.0318
20	Letter Memory	3.4445	.0320
21	Gottschaldt	2.9181	.0438
22	Seashore-Tonal Memory	2.7425	.0492
23	California P.S.-Total	2.7366	.0492
24	Dynamometer-Left Hand	2.2702	.0660
25	Two-hand Coordination-Right Hand	2.2574	.0664
26	Seashore-Pitch	2.2539	.0668
27	Individual Tempo	2.2702	.0730
28	P.M.A.-Number	2.1166	.0730
29	Minnesota-Right Hand	2.0091	.0783
30	Dot Counting	1.4376	.1150
31	Color-Form Memory—(C+F)	1.3297	.1253
32	Color-Form Memory-Form	.9510	.1650
33	Backward Writing	.8263	.1814
34	Rapid Spelling	.7827	.1889
35	P-Test	.7133	.2004
36	Cross-out	.5659	.2258
37	P.M.A.-Reasoning	.3978	.2643
38	Acuity-Left	.3014	.2929
39	California P.S.-Social	.1942	.3205
40	Seashore Rhythm	.1298	.3607
41	Retinal Rivalry	.0556	.4053
42	Shape Constancy-Span	.0505	.4130
43	California P.S. Self	.0446	.4172
44	Telegraph Key-Left Hand	.0388	.4207
45	Color-Form Memory-Color	.0262	.4340
46	Shape-Constancy	.0236	.4470
47	Tapping-Right Hand	.0140	.4551
48	Ehrenstein Illusion	.0055	.4821
49	Two-hand Ratio	.0292	.5661
50	Two-Hand Coordination-Both Hands Together	.0376	.5793
51	Dot Patterns	.0505	.5870
52	Acuity-Both Eyes	.0556	.5947
53	Acuity-Right	1.0261	.8448

this question when he states that, "The 13 tests which are significant at the 1 per cent level represent visual and verbal functions as well as several motor functions." Relative to the contribution of heredity to the observed results he states: "These data seem to justify the conclusion that large differences in psychological tests are found much more frequently among fraternals than among identicals." And in a concluding paragraph he writes: "These findings also appear to support the conclusion that the mental abilities in these test performances have large genetic components."

As a participant in the study, I subscribe to these very general conclusions.

From a genetic point of view it would be of interest to have these twin data analyzed more specifically for the relative contributions of heredity and environment to observed variations in the occurrence of the various capacities or abilities which the test scores represent, but so far completely satisifactory statistical tests for this purpose have not been found.

In addition to what are generally called variations in general intelligence or in components of intelligence, there occur of course within the normal range hundreds of behavioral variations of one form or another. I am thinking here especially of variations in behavior that may be related to sex, personality, temperament, cooperativeness, sociableness, morals, etc. Of all these variations the differences between the two sexes in basic sexual behavior patterns are probably the most completely inherited. At least, it seems true that primary physical differences in sex are completely or nearly completely genetically determined, and all available evidence indicates that these basic physical differences determine to a major degree the primary differences in the behavior of the two sexes. With respect to differences in sexual behavior for a given sex, or to differences between individuals of either sex relative to other aspects of personality, temperament, cooperativeness, sociableness, morals, etc., the extent to which heredity plays a role is less clearly indicated. The studies which have been reported do give some positive evidence, and it is my opinion, based partly on these results and partly on less direct evidence that heredity contributes considerably to fundamental differences in all or most of these subtle behavioral characteristics, *i.e.*, to variations in capacities. Everyone will probably agree that the extent to which each inherited variation in a "normal" capacity is expressed depends upon the physical and cultural environment to which it is exposed. Some environments tend to enhance inherited differences in "normal" capacities, whereas others tend to mask them. It seems probable, however, that the expression of most of these inherited variations can never be masked completely, but become evident to some degree at least, at some time or other, in the lives of individuals.

With respect to the inheritance of superior or special mental capacities the evidence is quite specific and conclusive. At least it seems certain that variations in musical and mathematical capacities have some genetic basis. Actually one hardly needs the results of scientific studies to arrive at this conclusion—for who can attend a Mendelssohn, a Bach or a Mozart concert and have the temerity or audacity to say: "I could have composed that music had I received the proper training"; or who among us would dare claim that he could have contributed the basic mathematical formulations of Pascal, Poincaré or Klein had he been reared in the environment in which any one of these men developed.

Again we find it difficult to formulate an overall genetic statement relative to an entire subdivision of behavioral variations except to say that a considerable amount of evidence exists which demonstrates that variations in many different capacities, whose expressions fall within the "normal" group have been shown to have some hereditary basis.

It would be even more difficult to formulate a general statement relative to heredity and environment which would cover all three behavioral groups as a unit, *i.e.*, all of man's behavioral characteristics. For this reason we shall refrain from attempting such a statement.

Among the numerous genetic problems which are suggested by the data reviewed so far, one pertains to the number of loci which exist on human chromosomes whose gene variations play a more or less direct role in the occurrence of human behavioral variations. In their 1944 paper referred to earlier, Allan, Herndon, and Dudley ventured the opinion that, "There are probably several hundred genes concerned in the production of low grade mental deficiency." I have attempted an actual count based on reports in the literature and have arrived at the conclusion that there appears to be good evidence for the existence of at least eight human chromosome loci where gene variations may result more or less directly in the occurrence of human mental deficiency or oligophrenia. Less specific evidence suggests that the number of such loci may be two or even three times higher. How many actually exist is difficult to predict, but I suspect that the number may be well over a hundred.

Relative to the second or the mental disorder group of behavioral variations I have also attempted a direct count, and have concluded that good evidence is to be found in the literature for the existence of a dozen or more directly involved loci. As to the total number which may exist I hardly dare to venture an opinion, but I suspect that this number may be as high, if not higher than the number which is involved in the occurrence of mental deficiency. Actually these two sets of loci may not be completely independent. From a genetic point of view one can conceive of one member of a series of genes at one locus (one gene of an allelic series) being responsible for a particular form of oligophrenia, and another member responsible for a particular type of mental disorder. Even the same gene in different genetic combinations or under varying conditions of environment might conceivably express itself in two such seemingly distinct ways.

With respect to the third category, or the "normal" range of human behavioral variations, it is an even more difficult task to arrive at an estimate of more or less directly involved human chromosome loci. Not only do the inherited variations within this range appear to be exceedingly numerous, but it seems very probable that many of them are what the geneticist calls polygenic characters, *i.e.*, the result of the action of genes at many loci. However, it also seems probable that if many loci are involved, relative to each recognized variation, many of them for the different variations overlap An estimate of one thousand loci for the "normal" group does not seem excessively high.

On the basis of our estimates for the three separate categories of behavioral variations, and allowing for a considerable amount of overlap of loci for the three groups, we arrive at an estimate of at least one thousand loci whose genes are more or less directly involved in the occurrence of all man's behavioral variations. This number would be only about one-tenth of all loci that commonly are estimated to be present on the twenty-four chromosomes of man. Considered strictly from a logical point of view this fraction does not seem to be more than a reasonable proportion of all loci which one might expect to be concerned with as important a set of variations as those which occur in man's behavioral characteristics. In fact one might have expected one-fourth or even one-half of all loci to be more or less directly involved.

If we accept the figure of one thousand loci as a reasonable estimate, and if we assume the existence of two genes (alleles) at each locus, we arrive at a total number

of possible behavioral genotypes given by the expansion of three to the one-thousandth power (3^{1000}), which is an exceedingly large number. If, in addition to this possibility, it should be true that some of the one thousand loci are represented by more than two genes (alleles), the number of possible behavioral genotypes would be increased with each additional locus of this type and with each additional allele at each of such loci. Multiple alleles as high as eight or ten in number are known for some human chromosome loci, and among lower organisms the number is known to reach a somewhat higher total.

Should the conditions outlined in the preceding paragraphs represent reality—and to me it seems very probable that they do—it follows that with the exception of monozygotic plural births all human beings should be genetically different to a considerable degree relative to behavioral variations. This should be true even to some degree for ordinary members of a given sibship. That these conditions are realized seems probable not only with respect to abnormal behavioral variations but also with respect to those which fall within the normal range. Accordingly it would seem that more serious consideration should be given to these probabilities than there ever has in the past, in the training of children in the home, in the formulation and administration of educational policies, in the enactment and enforcement of local and national laws, and perhaps most importantly of all in the daily associations of individuals.

From statements which appear in newspapers, magazine articles and books it seems true that, even in this day and age, there exist some people who think that all human beings who are born and survive will respond equally to all environmental situations, or if they do not think this, would want all individuals to respond in such a way. Not only does it seem true, on the basis of the evidence available, that it would be impossible to make the behavior of all individuals uniform because of inherited differences in capacities but also that it would be extremely undesirable to have such conditions realized. To me it seems probable that should such conditions obtain no one would be happy, no one would be active, no one would have a feeling of personal satisfaction, and perhaps most important of all no one would feel free in any real sense. A good discussion of this last point has been presented by Professor Roger J. Williams in his latest book, "Free and Unequal."

Relative to genetic differences between human populations with respect to behavioral characteristics very few studies have been reported or attempted, primarily because of test or measurement difficulties. Hence, there is a limit to the extent to which a positive statement may be made which is based on direct evidence. However, since many behavioral differences between individuals within populations have been shown to exist and to have some hereditary basis, if not to be inherited in a relatively simple Mendelian fashion, it seems reasonable to assume that any two or more populations which have been separated to a sufficient degree, and for a long period of time for evolutionary forces to have differentiated them genetically with respect to what are generally known as physical characteristics, would also have become differentiated genetically—at least to some degree—with respect to behavioral characteristics (Strandskov, 1944).

By a genetic difference between populations is not meant a difference in any absolute sense as is so often assumed, but a difference in the percentage frequencies of the genes (alleles) which occupy the various chromosome loci. In general it may be said that the significance of the genetic difference between two or more populations depends upon the number of chromosome loci involved in the production of the difference, the extent of the percentage differences in the frequencies of the genes at each

involved locus, and the import of the effects of the genes concerned. (For a brief outline or summary of general genetic and evolutionary principles see Strandskov, 1950.)

A few statements by geneticists appear in the literature which seemingly are not in complete agreement with the statement presented above. Dobzhansky (1950) argues for a high degree of similarity in respect to what he calls "educability," but does conclude that, "Genes that condition or modify special abililties, intelligence, emotional reaction and other psychic traits vary from individual to individual and from group to group." David and Snyder (1951) seem less convinced of the existence of populational differences in heredity relative to behavioral characteristics. Following a discussion of the extent to which selection operates within the human species in favor of plasticity of response, they write: "It therefore seems to us highly improbable that any significant genetic differentiation in respect to particular response patterns, personality types, temperaments or intellectual capacities among different populations or races has occurred in the history of human evolution."

I would agree with Dobzhansky that because of the nature of some of man's behavioral capacities existing human populations may not be so different genetically relative to them as they are relative to some other capacities. Any disagreement that I might have with the conclusion of David and Snyder might depend upon what these authors mean by a "significant genetic differentiation."

Not only does it seem to me probable that present-day populations differ genetically to a considerable degree relative to some behavioral as well as some physical characteristics, but I would consider it fortunate or desirable that they do so. I am of this opinion more or less for the same reasons that I considered it desirable or fortunate that differences in heredity occur between individuals within a population.

There exists one additional reason, not mentioned thus far, why it seems desirable or fortunate that individual and populational differences in heredity occur relative to behavioral as well as physical characteristics. This reason is that without such genetic variation the behavioral or mental evolution of man would not or could not continue. It may be true that many people are quite satisfied with the existing evolutionary stage of man and are unconcerned about his future evolution. However, it seems justifiable to think that there is room for genetic improvement with respect to some or even all of man's characteristics. It unquestionably is true that man's future evolution will not be so rapid and phenomenal as was his evolution the past million or more years, but it does not seem completely unreasonable to assume that a future man may be evolved sometime who, because of his heredity, will be able to experience a greater degree of happiness than can present-day man; who can live peacefully more readily than present-day man seemingly can, and who can claim more justifiably the dignity which present-day man so readily or hastily ascribes to himself.

If it be true, as it seems to be, that individual and populational differences in heredity exist relative to behavioral as well as physical characteristics, and if it be desirable or fortunate that they do occur, then it would seem to me to be sensible for us to recognize these differences and to give intelligent consideration to them rather than to ignore them or try to wish them away as so many people seemingly try to do.

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Family Life Division

Statistical Aspects of Marriage and Divorce By Religious Denomination in Iowa

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THE IMPORTANCE OF RELIGIOUS COMPOSITION in any study of population has long been recognized by demographers. Indeed, some family sociologists claim that, next to race, religion is the most decisive factor in marital selection, and most authorities allege that the inter-faith marriages are hazardous and harmful to all concerned.

Professional persons and religious groups have often decried the absence of population statistics on religious preference in the United States. In Canada such information is regularly gathered without any resentment from its people. In the United States several of the states have made such enumerations, and a wide variety of surveys have successfully gathered information on religious aspects of the population. There is neither any prohibition against the collection of such data in this country, nor does there seem to be an unwillingness on the part of the people to declare themselves in statistical surveys.

Now, for the first time in the United States, a vital statistics office has included a query as to religious preference on its registration forms for marriage and divorce. In spite of the general newness of the forms (which included several modifications and an entirely new format) and without any coercion being exercised, both parties answered the question on "Religious Denomination" in 95 per cent of all marriages (over 20,000) and in 87 per cent of all divorces (over 5,000) which took place in 1953 in Iowa. Denominational preference among Protestants was less adequately given: where both parties were Protestant, specific denominations were given in only 76 per cent of the marriages and in only 41 per cent of the divorces. Marriages and divorces of Catholics appear to have been rather completely reported.

A preliminary analysis of these Iowa statistics showed that in spite of the prevailing opinion the rate of interreligious marriage was quite high: for instance, 42 per cent of all marriages involving a Catholic were found to be mixed marriages. The mixed-Catholic unions appeared more often among those getting divorced than among those getting married. The both-Catholic marriages were about half as likely (or less) to end in divorce as were marriages in general. All of the major denominations, however, contributed importantly to the divorce picture.[1]

[1]A detailed presentation and substantiation of these remarks is given in a previously written article: Loren E. Chancellor and Thomas P. Monahan, "Religious Preference and Inter-Religious Mixture in Marriages and Divorces in Iowa," *American Journal of Sociology* (publication forthcoming). Additional bibliography will be found in: Thomas P. Monahan and William M. Kephart, "Divorce and Desertion by Religious and Mixed-Religious Groups," *American Journal of Sociology* LIX (March, 1954), pp. 454-465. The new forms asked for the "Religious Denomination" of both parties. Because the parties to the marriage so frequently declared an association with a church, in comparison to what one would expect from church membership figures, it seems that many persons declared their religious preference although they were not actually church members. See, Neva R. Deardorff, "The Religio-Cultural Background of New York City's Population," *Milbank Memorial Fund Quarterly* XXXIII, (April, 1955), p. 2. The Public Affairs Committee has published a pamphlet on this subject (No. 204), Algernon D. Black, "If I Marry Outside My Religion," March, 1954; and a book has recently appeared by Rev. James A. Pike, *If You Marry Outside Your Faith*, New York: Harper & Brothers, 1954.

Religious Composition of the Population from Marriage Data

In the absence of population statistics, marriage data can give us a rough approximation of the religious composition in an area provided there is no important variation in the propensity to marry, the age at marriage, or the age distribution of the different denominations. Such a use of marriage data could be negated by a large number of interstate or migratory marriages, or by an unequal frequency of remarriage between the different denominations. A distribution by denominations of "first" marriages of *resident* brides tends to eliminate such remarriage and residence distortions, and this kind of modification of marriage statistics under ordinary circumstances should give us a fair measure of the religious composition of a population.[2] As shown in Table 1, migratory marriages and remarriages alter the denominational percentages, but not drastically in Iowa. Because of the tendency for Catholics to marry at the place of residence of the bride, by church regulation, and because of the lower divorce rate among Catholics and the ecclesiastical restriction on remarriages when divorce does occur, the Catholic marriages (according to the wife's religion) constitute a somewhat higher proportion of the marriages after refinement is made for residence and "first" marriage.

TABLE 1

PER CENT DISTRIBUTION OF MARRIAGES BY RELIGIOUS DENOMINATION OF WIFE FOR TOTAL AND "FIRST" MARRIAGES, AND FOR IOWA RESIDENT BRIDES IOWA, 1953*

Religion of Wife	All Marriages		Marriages with Iowa Resident Brides	
	Total	"First"†	Total	"First"†
Total	100.0	100.0	100.0	100.0
No. of cases	21,084	13,442	16,858	11,361
"None"	2.6	2.1	2.2	1.9
"Protestant"	14.2	12.5	13.5	11.8
Catholic	19.7	23.3	20.1	24.0
Lutheran	16.9	17.3	15.2	16.2
Methodist	18.7	18.2	19.9	18.8
Christian‡	5.6	4.8	6.3	5.1
Baptist	5.4	4.7	5.2	4.5
Presbyterian	5.4	5.6	5.6	5.7
Congregational	2.0	1.8	2.0	1.7
Reformed§	2.0	2.5	2.4	2.8
Evangelical Un. Br.	1.1	1.1	1.2	1.3
Episcopalian	.8	.8	.6	.6
Remainder	5.6	5.3	5.8	5.6

*Eliminating records for which religion was not stated. For the number of cases, see Iowa State Department of Health, Des Moines, Iowa, *Annual Report of the Division of Vital Statistics, 1953*, pp. 203-209. The Jewish group constituted 0.3 per cent in all classes, which is about the proportion reported in the *American Jewish Yearbook for 1954*, pp. 3-7. *The Official Catholic Directory for 1950*, however, indicates that only 13.5 per cent of Iowa's population were Roman Catholics.

†See footnote 2. p. 163.

‡Christian is composed of Christian Disciples, Christian Church, and Christian.

§Reformed includes Reformed Church in America, Christian Reformed, and Evangelical Reformed.

Migratory Marriages by Denomination

Surprisingly enough, brides in "first" marriages in several of the large denominations were more often residents of the state than were the Catholic brides. For all denominations the degree of nonresidence is higher for the remarried than for the "first" married, and generally higher for the divorced segment than for the widowed class. Divorced persons *in all denominations* swell migratory marriage.

Occupational Distribution of Marriages by Religious Denomination

Such information is of value in interpreting age-at-marriage variations, divorce differentials, and the like.[3] Although it cannot be taken as a reliable index of conditions prevailing in the population as a whole, the occupational distribution of

[2]There is no reason to assume that the age distributions of the major denominations are importantly different, or that their marital propensity varies to any significant degree. A discussion of marriage age follows. "First" as used in this article refers to marriages (or divorces) in which both parties are being married (or divorced) for the first time. For the statistical similarity of the distributions of marriage and population records for denominations, see Dominion Bureau of Statistics, Ottawa, Canada, "Some Characteristics of Husbands and Wives as Indicated in the Census and Vital Statistics," *Reference Papers, 1950*, No. 10, pp. 14-17.

[3]Thomas P. Monahan, *The Pattern of Age at Marriage in the United States*, Philadelphia: Stephenson-Brothers, 1951, pp. 256-286, and "Divorce by Occupational Level," *Marriage and Family Living*, publication forthcoming.

marriages is at least suggestive. Where both parties did not declare their religion, or gave it as "Protestant" or "None," we find below-average percentages in the farm group and overrepresentation in the semi-skilled and labor-service occupations. The Baptists (about one-fourth of whom were Negroes) show a similar pattern. The Lutherans are strongly represented in the farming class, and the Presbyterians tend to concentrate in farming and white-collar occupations.

The occupational pattern offers very little explanation for the favorable divorce position of the both-Catholic marriages compared to total marriages; and the relatively greater occurrence of divorce among mixed-Catholic marriages as compared with both-Catholic marriages finds only a slight explanation in their different occupational configurations.

Median Age At First Marriage

A much larger number of cases would be required to control these data for occupation, the major factor influencing age at

TABLE 2

DISTRIBUTION OF MARRIAGES BY OCCUPATIONAL GROUP OF HUSBAND FOR TOTAL AND "FIRST" MARRIAGES IOWA, 1953

TOTAL MARRIAGES
% DISTRIBUTION BY OCCUPATIONAL GROUP

Religious Combination*	Total	Farm	Profes-sional	Owner, Official	Clerical Sales	Skilled	Semi-Skilled	Labor Service
Total	100.0	22.6	7.0	4.5	11.2	18.1	18.4	18.2
Both Catholic	100.0	28.6	6.7	4.1	13.6	15.7	15.6	15.7
Mixed Catholic	100.0	12.9	6.4	4.6	12.8	20.6	22.4	20.3
Both Lutheran	100.0	32.7	6.4	4.2	10.4	17.3	15.8	13.2
Both Methodist	100.0	26.9	8.0	4.8	9.9	17.0	17.0	16.4
Both Christian	100.0	22.4	7.5	3.1	7.5	21.6	17.9	20.0
Both Baptist	100.0	11.5	5.4	2.6	10.9	20.0	23.5	26.1
Both Presbyterian	100.0	25.2	10.9	7.1	18.8	11.3	13.5	13.2
Both Reformed	100.0	65.0	2.8	2.2	3.3	8.9	8.9	8.9
Other Same Denomination	100.0	25.8	14.2	2.2	12.8	15.3	13.6	16.1
Other Mixed Denominations	100.0	25.2	8.3	5.3	11.8	17.2	15.7	16.5
Both "Protestant"	100.0	14.1	5.5	4.1	10.4	21.4	22.7	21.8
Either Party "None"	100.0	15.2	5.6	4.5	9.9	21.2	20.6	23.0
(Both "None")	100.0	12.0	5.1	5.4	9.3	17.8	22.1	28.3
Both Not Stated	100.0	9.4	3.8	4.1	8.3	22.0	26.2	26.2
Remainder	100.0	19.2	5.8	4.0	9.4	18.3	23.3	20.0
"First" Marriages								
Total	100.0	27.2	7.8	3.2	11.1	15.9	16.8	18.0
Both Catholic	100.0	30.5	7.0	3.7	13.3	15.1	14.8	15.6
Mixed Catholic	100.0	14.4	6.8	3.4	12.6	19.6	21.8	21.4
Both Lutheran	100.0	36.7	7.5	3.6	10.2	14.6	14.2	13.2
Both Methodist	100.0	31.2	8.4	3.3	9.3	15.3	16.3	16.2
Both Christian	100.0	24.2	7.0	1.8	7.0	18.6	18.6	22.8
Both Baptist	100.0	13.2	5.8	2.1	9.5	19.6	24.9	24.9
Both Presbyterian	100.0	29.1	10.9	4.2	17.6	9.7	15.8	12.7
Both Reformed	100.0	63.7	2.7	2.7	1.4	10.3	11.0	8.2
Other Same Denomination	100.0	26.7	18.1	2.0	12.2	14.1	11.8	15.1
Other Mixed Denominations	100.0	29.1	9.0	3.3	11.7	15.8	14.8	16.3
Both "Protestant"	100.0	18.7	6.2	2.7	10.6	19.0	20.1	22.7
Either Party "None"	100.0	20.8	5.5	2.5	10.0	16.9	19.6	24.7
(Both "None")	100.0	19.4	5.0	0.9	6.7	12.6	23.5	31.9
Both Not Stated	100.0	17.6	4.4	1.1	7.1	12.1	25.3	32.4
Remainder	100.0	24.7	6.8	2.9	8.7	15.3	21.3	20.3

*Either Party "None" includes the Catholic-"None" types, which are also shown with the Mixed-Catholic group. The Remainder group does not include reports made on old forms, which did not contain the query on religion. The Jewish Either-Party group (Total cases, 73) were distributed as follows: 1.4, 26.0, 23.3, 30.1, 6.9, 9.6, and 2.7 per cent. See footnote 4. Students, persons in military service, and retired workers were excluded.

TABLE 3

MEDIAN AGE AT "FIRST" MARRIAGE ACCORDING TO RELIGIOUS DENOMINATION OF HUSBAND AND WIFE IOWA, 1953*

Religious Denomination	No. of Cases		Median Age at "First" Marriage	
	Husband	Wife	Husband	Wife
Total	13,729†	13,727†	22.7	20.0
"Protestant"	1,989	1,683	22.5	19.5
Catholic	2,997	3,133	23.5	20.8
Lutheran	2,239	2,324	23.0	20.1
Methodist	2,336	2,440	22.2	19.7
Christian	654	639	21.8	19.1
Baptist	637	634	22.0	19.4
Presbyterian	691	746	22.5	20.4
Congregational	213	245	22.8	20.3
Reformed	313	330	22.7	20.5
Evangelical Un. Br.	131	153	22.1	19.7
"None"	471	278	22.4	19.0
Not Stated	340	291	22.0	18.8

*Average not calculated for denominations with less than 100 cases.
†For which the information was given on age at marriage and number of times married for both parties.

marriage. The occupational aspect is clearly evident in the Jewish group (52 men and 42 women) with median ages of 26.2 for grooms and 21.6 for brides. Considering the major denominations only, the Catholics had the highest median ages, and the Christian Disciples the lowest. But, on the whole it is remarkable to find a variation of only a year or two between the different denominations in their median age at "first" marriage. Couples getting divorced had been married about a year earlier than the average for 1953 marriages, again with surprisingly little variation appearing between religious groupings of divorces.

Monthly Variation

In studies which utilize samples of marriage records, one must be alert to the effect of religious constraints upon marriage during holy seasons. Outstanding is the fact that only 1.0 per cent of the both-Catholic "first" marriages in Iowa took place in March 1953. Even among mixed-Catholic marriages (mostly under church auspices) there was a 50 per cent drop in marriages in this month. Protestant denominations showed no such variation. By excluding all marriages involving Catholics, the "seasonal" decline in this month disappears entirely.

Marriages by Religious Ceremony

Prior Marital Status. The marital history of the couple is significantly related to the type of ceremony chosen. Whereas only 81 per cent of *all* marriages in Iowa were performed by a clergyman, in the case of "first" marriages the figure was 88 per cent. Widowhood for either party brought a drop in the proportion by religious ceremony. A divorce experience effected a further decline, so that only about half of the marriages in which both parties had at some

TABLE 4

PER CENT OF MARRIAGES BY RELIGIOUS CEREMONY ACCORDING TO COUPLE'S PRIOR MARITAL HISTORY IOWA, 1953

Marital Status Type	No. of Cases*	% Married By Religious Ceremony
Total	23,180	80.7
"Firsts"	14,528	88.3
Both Divorced†	1,837	51.6
Husband Only Divorced†	1,194	65.0
Wife Only Divorced†	1,294	61.6
(Either or Both Divorced) †	(5,016)	(59.5)
Divorced-Widowed Combination	691	67.3
"First"-Widowed Combination	546	81.1
Both Parties Widowed Only	512	83.6

*For which marital status was so stated.
†If any prior marriage involved a divorce.

TABLE 5

PER CENT OF MARRIAGES BY RELIGIOUS CEREMONY ACCORDING TO HUSBAND'S OCCUPATIONAL GROUP AND COUPLE'S PRIOR MARITAL HISTORY
IOWA, 1953

Occupational Group*	All Marriages	% Married by Religious Ceremony "First" Marriages	Either or Both Divorced	Either Party Widowed Only
Total	80.7	88.3	59.5	83.1
Farming	93.7	96.6	75.0	89.0
Professional	88.9	94.6	70.9	(96.6)
Owner-Official	78.5	90.9	63.6	(85.1)
Clerical-Sales	82.5	90.5	66.5	(83.3)
Skilled	75.1	85.8	58.8	80.2
Semi-skilled	70.7	81.8	51.9	80.2
Service	61.6	78.4	50.2	(78.1)
Labor	71.7	79.1	55.4	73.5
Not Stated	69.8	(78.7)	—	—

*Excluding students, persons in military service, and the "retired." Coded in accordance with the U.S. Census classification; see footnote 4, p. 000. For number of cases see Table 4 and references in footnotes 3 and 6, pp. 163, 170. Figures in parentheses are based on less than 100 cases.

time been divorced were officiated by a clergyman. Undoubtedly, in addition to the lesser concern of previously married persons with a religious ceremony, as shown by the widowed-only group, the various prohibitions of some denominations against remarriages of divorced persons within the church is an important factor bringing about this result. Nevertheless, divorced persons do get married—without church sanction.

Occupational Variations. A rather clear gradation in the proportion of marriages begun by religious ceremony appears according to the socio-economic classification. For "first" marriages the range is from about 80 per cent for the laboring and semi-skilled groups to about 95 per cent for the farming and professional classes. The same variation is quite apparent in the "divorced" class of marriages also. It is noteworthy that the occupations with higher proportions of divorce (as shown by another study) also show higher proportions of marriages by civil ceremony for all marital types.[4]

By Religious Denomination. For "first" marriages the affirmation of "Protestant" only or "None" was associated with below-average percentages by religious ceremony, while only one-third of those in the "Not stated" group were married by a clergyman. Intermarriage of Catholics greatly decreases the percentage by religious ceremony: from 94 per cent for the both-Catholic group to 71 per cent for the mixed-Catholic group. In the Protestant group of "first marriages involving couples of the same or different Protestant denominations, about 95 per cent were begun under religious auspicies.

For all religious groups the previously divorced were less often married by a clergyman. However, considering the frequent preachments against divorce, the drop in the percentage of "church" marriages seems only moderate for those couples declaring specific Protestant denominations. In cases where the religion of both bride and groom was recorded as "Protestant" only or "None", relatively higher proportions (over half of these marriages) were by civil ceremony. For the Catholic groups only one-third of the marriages involving a divorced person were by religious ceremony.

Divorce As Revealed by Marriage Records

Prior marital status when given on marriage records can be used as a special "indi-

[4] *Ibid.* Classification was in accordance with: U. S. Bureau of the Census, *1950 Census of Population, Classified Index of Occupations and Industries*, Washington, D. C., Government Printing Office, 1950.

TABLE 6

PER CENT OF MARRIAGES BY RELIGIOUS CEREMONY ACCORDING TO RELIGIOUS COMBINATION AND PRIOR MARITAL HISTORY OF THE COUPLES
IOWA, 1953

Religious Combination	All Marriages	% Married by Religious Ceremony "First" Marriages	Either or Both Divorced	Either Party Widowed Only
Total	80.7	88.3	59.5	83.1
Both Catholic	88.5	93.8	37.7	83.0
Mixed Catholic	60.7	71.2	35.4	(74.0)
Both Lutheran	91.3	94.3	78.6	(91.1)
Both Methodist	94.2	96.1	86.4	(92.6)
Both Christian	92.8	96.1	81.5	—
Both Baptist	82.9	86.4	71.6	—
Both Presbyterian	93.8	94.5	(87.3)	—
Both Reformed	100.0	—	—	—
Other Same Denomination	95.1	96.5	(89.8)	—
Other Mixed Denominations	92.1	94.7	82.9	90.7
Both "Protestant"	65.2	76.0	46.1	(67.7)
Either Party "None"	67.4	79.6	44.9	75.0
(Both "None")	54.1	69.9	35.7	—
Both Not Stated	16.1	33.9	5.9	—
Remainder	83.7	91.4	68.3	(83.0)

•See footnote to Table 5. Figures in parentheses are based on less than 100 cases; cells with fewer than 50 cases not calculated.

cator" of divorce with reference to other aspects of the record. This method must be employed cautiously, however.[5]

Using records for which the facts of remarriage were given (encompassing about 88 per cent), "first" marriages were found to account for 68.5 per cent of all marriages, with variations among the denominations. The proportions of "first" marriages were higher than the average among Catholic and Reformed couples.

One or both parties had had a divorce in 25 per cent of all marriages; and over 80 per cent of the remarriages involved a divorced person. According to the husband's or the wife's religion similar relationships are observed, with some variations appearing for the particular denominations. It is apparent that in *all* denominations a considerable proportion of the remarriages involve previously divorced persons. Although below average, in Catholic remarriages the Catholic had been divorced in half of the cases, and in three-fourths of the remarriages either they or their spouses had been divorced. In this regard some denominations registered lower "divorce" incidence among the remarried than did the Catholics, and others about the same proportions.

In evaluating these figures, it should be recognized that some denominations may restrict (in effect, prevent) the remarriage of their communicants by prohibition of remarriage of divorced persons. This could help to account for the "low" divorce percentages in remarriages for some groups. However, as these records show, such divorced persons may get married by a civil officiant and correctly declare their religious preference on the marriage certificate. In a previous article it was shown that Catholics probably had only half the divorce rate of the total Iowa population. And, here again, we find that in only 14 per cent of *all* marriages of Catholics (husbands and wives separately) was one or other of the parties divorced as compared with 25 per cent for

[5]There is undoubtedly some falsification of prior marital status. Previously married persons, through misunderstanding or intent, will sometimes claim to be "single." Divorced persons, especially, may seek to hide their status. Also, where multiple statuses pertain (widowed and divorced) one only (widowed) may be declared. Finally, if a large number of persons do not indicate their status it is risky to assume (on any basis) that there is no bias or desire for secrecy particular to one group or another, or that the unknowns would be distributed in the same proportion as the known data.

TABLE 7

FREQUENCY OF REMARRIAGE AND DIVORCE BY RELIGIOUS DENOMINATION OF WIFE AS INDICATED BY MARRIAGES PERFORMED IOWA, 1953

Religion of Wife	% of All Marriages		% of Remarriages
	"First" Marriages	Either or Both Divorced	In Which Either or Both Parties Has Prior Divorce
Total*	68.5	25.0	79.6
"Protestant"	60.0	34.4	86.1
Catholic	80.7	14.1	73.3
Lutheran	71.0	22.5	77.8
Methodist	69.3	23.5	76.6
Christian	61.9	29.7	77.9
Baptist	61.5	32.1	83.4
Presbyterian	70.9	23.1	79.4
Congregational	65.2	25.5	73.3
Reformed	85.3	8.8	(59.6)
Evangelical United Brethren	72.2	22.2	(79.7)
Episcopalian	67.7	27.1	(84.0)
Mormon	68.1	23.0	—
Other Denominations	70.3	21.9	75.7
None	54.3	41.0	89.7
Not Stated	38.6	52.3	85.2

*Total excludes reports made on old forms. Figures in parentheses are based on less than 100 cases. Using the husband's religious denomination as the point of comparison gives essentially the same results.

the whole population of Iowa. The proportion of divorces was lower among the marriages of persons who designated themselves as members of the Reformed Church than among the Catholics.

When we refine our statistics to refer to *combinations* of religion, so as to attend more closely to those which are homogamous, we find higher percentages of "first" marriages among those of the same faith. The both-Catholic marriages show only 9 per cent of all their marriages involved a divorced person, versus 30 per cent for the mixed-Catholic marriages. Here, too, sur-

TABLE 8

FREQUENCY OF REMARRIAGE AND DIVORCE BY RELIGIOUS COMBINATION OF COUPLE AS INDICATED BY MARRIAGES PERFORMED IOWA, 1953

Religious Combination	% of All Marriages		% of Remarriages
	"First" Marriages	Either or Both Divorced	In Which Either Party Had Prior Divorce
Total*	69.6	25.4	83.5
Both Catholic	87.3	9.3	73.2
Mixed Catholic	65.2	30.1	86.4
Both Lutheran	75.4	19.2	78.2
Both Methodist	71.8	22.6	80.1
Both Christian	67.8	26.0	80.6
Both Baptist	65.4	30.4	87.9
Both Presbyterian	74.4	19.7	(76.8)
Both Reformed	92.5	2.7	—
Other Same Denomination	76.3	16.9	(71.5)
Other Mixed Denominations	69.4	24.5	80.2
Both "Protestant"	61.4	34.2	88.8
Either Party "None"	57.2	38.3	89.5
(Both "None")	49.8	47.3	94.2
Both Not Stated	37.2	58.2	92.6
Remainder	62.5	32.5	86.6

*Total excludes reports made on old forms. For this table, only records which were wholly complete as to the marital status of both parties were used. Figures in parentheses are based on less than 100 cases; cells with fewer than 50 cases not shown.

prisingly few marriages in the both-Reformed group involved a divorced person. A spouse was less often previously divorced in the marriages of Lutherans and Presbyterians than among those of Christian Disciples and Baptists. The Methodists rank in a middle position.

The Petitioner in Divorce Actions

Because remarriages differ from "first" marriages in many characteristics, it might be supposed that there would be a departure from custom and husbands would initiate more of the petitions. It turns out that there is no such difference. In both types of marriage the wife started the divorce action in 77 per cent of the cases.

The variation between the denominational groups was small. Women started the actions somewhat more often when both parties were Catholic, and mixed-Catholic divorces held only a slightly above average position.

Duration of Marriage Before Divorce

Broken marriages which linger before legal dissolution could tend to depress the yearly rate of divorce. On the other hand, a quickness to divorce might be taken as an indication of marriage fragility. Do Catholics or some other religious denomination, we may ask, tend to have significantly longer or shorter marriage durations?

"First" marriages last considerably longer (71 per cent longer) than remarriages as measured by the crude mean and median durations of marriage at the time of divorce. In the general context of understanding, and in discussions of divorce and its elements, probably most people have "first"

TABLE 9

PERCENTAGE OF DIVORCE CASES WITH WIFE AS PETITIONER, BY RELIGIOUS COMBINATION IOWA, 1953

Religious Combination	% Wife Petitioner, Type of Divorce "First"	Remainder
Total	76.5	76.8
Both Catholic	86.0	(80.6)
Husband Only Catholic	80.7	78.3
Wife Only Catholic	77.9	76.7
Both Lutheran	80.3	(78.6)
Both Methodist	78.4	73.5
Other Same Denomination	79.9	73.3
Other Mixed Denominations	77.7	75.8
Both "Protestant"	72.1	74.5
Both "None"	—	—
Other "None" Combinations	87.1	84.2
Both Not Stated	76.2	85.4
Remainder	71.9	75.9
Old Form	66.7	(70.4)

*Figures in parentheses are based on less than 100 cases; cells with fewer than 50 cases are not shown.

TABLE 10

DURATION OF MARRIAGES ENDING IN DIVORCE BY RELIGIOUS COMBINATION OF COUPLE, IOWA, 1953

Religious Combination	All Divorces		"First" Divorces		Remainder	
	Median	Mean	Median	Mean	Median	Mean
Total	5.1	8.0	6.5	9.8	3.8	5.8
Both Catholic	7.3	9.9	9.0	11.5	(4.8)	(6.1)
Husband Only Catholic	4.4	6.7	5.3	8.0	3.9	5.5
Wife Only Catholic	4.4	6.6	6.0	7.8	3.5	5.5
Both Lutheran	6.9	9.2	9.0	10.8	(4.2)	(6.4)
Both Methodist	6.8	10.1	8.8	11.9	5.2	7.0
Both Christian	(5.2)	(9.6)	(7.2)	(11.4)	—	—
Both Baptist	(6.3)	(8.1)	—	—	—	—
Both Presbyterian	(7.8)	(12.4)	—	—	—	—
Other Same Denomination	(8.9)	(11.1)	(10.0)	(13.2)	—	—
Other Mixed Denominations	4.3	7.0	5.2	8.3	3.6	5.7
Both "Protestant"	4.6	7.3	6.0	9.1	3.5	5.4
Both "None"	(4.6)	(8.4)	—	—	—	—
Other "None" Combinations	5.3	8.3	6.5	11.0	4.3	6.3
Both Not Stated	5.0	8.4	6.2	10.5	4.0	6.0
Remainder	4.4	7.8	5.6	9.9	3.5	6.0
Old Form	5.1	8.3	6.4	9.7	(4.1)	(6.2)

*Figures in parentheses are based on less than 100 cases; cells with fewer than 50 cases are not shown.

divorces in mind. Since an unequal degree of remarriage in different groups could create a bias among the groups, and since couples in all groups have one chance to be counted as "first" divorces, it is most important that we concern ourselves with this class of divorces.[6]

"First" divorces of mixed-Protestant (denominational) marriages are dissolved 1.5 years sooner than the average (mean), and those of like faith last about a year or two longer than the average for the whole. The shorter duration of mixed marriages is most apparent in the Catholic types, where we find the mixed-Catholic group being dissolved over three years sooner than the both-Catholic marriages. The mean duration of the both-Catholic marriages (11.5 years) is 1.7 years above the average for all "first" divorces. Some other denominations (both-Methodist, for example), it should be noticed, have as long or longer a duration as the both-Catholic type. In remarriages there is a considerable narrowing down of some of the denominational differences.

In general one can see in these figures a suggestion of a relationship between a low divorce rate and a longer duration of marriage. The both-Catholic marriages show lesser divorce incidence and longer duration before divorce than the general averages. Compared to these marriages, the mixed-Catholic types show higher divorce incidence and shorter marriage durations. There is no exact concomitance, however, between a low rate of divorce and a long duration of marriage for *all* denominational groups in this set of data. On the whole it appears that while divorces of Catholics have a longer duration of marriage, it is not large enough to begin to account for the low level of divorces among them, especially since the durations for some of the other denominations are equally as long. If Catholic strictures operate to delay divorce among them, then some Protestant denominations must also exercise a strong constraining effect.

[6]See: *Excerpts, Marriage and Divorce in Iowa, Annual Report of the Division of Vital Statistics*, Iowa State Department of Health, Des Moines, Iowa, for 1950, pp. i, ii; and Thomas P. Monahan, "How Stable Are Remarriages?", *American Journal of Sociology* LVIII (November, 1952), pp. 280-288. There are no particular "impediments" to divorce in Iowa. A controlled analysis of Iowa divorces in recent years has shown that the greater proportion occur in the first year of marriage, declining rapidly after the second year and more slowly as the duration of marriage grows.

Prior Divorce in Divorce Cases

A high proportion of divorces are of the repetitive type. Indeed, our national divorce rate is constantly exaggerated by the increasing ease with which divorce-prone persons enter and reenter the marital lists in a sort of serial polygamy.

When the prior marital history of couples is given on divorce records, we may glean some information about the relative prevalence of divorce among different groups. A high proportion of "first" divorces and a low proportion of prior divorces would suggest (but not prove) a greater stability of marriage in a particular group. The information must be used cautiously, however.

In 18 per cent of the divorce cases both parties had been divorced before, and in 41 per cent of the cases one or both of the parties had been divorced previously. In data of this type the Catholic husbands (and wives) do not have the advantageous position heretofore found, several denominations showing smaller percentages of prior divorce than the Catholics. Again the "Protestant" only and "None" groups register higher than average figures on prior divorces.

If we separate the marriages of like faith, the both-Catholic divorcees exhibit relatively low amounts of prior divorces, and the mixed-Catholic couples relatively high frequencies in this "divorce" scale. Within the Protestant group, divorces involving mixed denominations tend to show higher proportions of prior divorce than do those involving couples of like denominations.

TABLE 11

PREVIOUS DIVORCE EXPERIENCE BY RELIGIOUS DENOMINATION, DIVORCES IN IOWA, 1953*

Religion of Husband or Wife	% of Total Divorces Showing a Prior Divorce: Both Parties Divorced		Only One Spouse Divorced		Either or Both Divorced	
	Husband	Wife	Husband	Wife	Husband	Wife
Total	17.5	17.5	28.8	29.3	40.6	40.7
"Protestant"	19.8	20.2	32.0	33.7	44.2	44.8
Catholic	16.6	16.2	26.7	27.2	38.7	38.5
Lutheran	12.3	15.5	23.9	25.5	36.2	37.4
Methodist	15.5	15.7	25.4	26.8	37.0	38.6
Christian	9.8	15.3	20.2	30.2	36.8	42.3
Baptist	21.4	26.5	38.5	37.8	51.0	49.6
Presbyterian	22.1	15.8	29.8	24.5	34.6	34.5
Congregational	(3.3)	(9.1)	(10.0)	(15.9)	(13.3)	(29.5)
Jewish	(11.8)	(8.3)	(11.8)	(16.7)	(29.4)	(16.7)
Other†	13.1	12.9	24.2	25.8	32.7	42.2
"None"	23.2	24.1	39.6	39.1	52.2	52.6
Not Stated	17.6	15.4	26.6	26.6	40.4	37.9

*Figures in parentheses are based on less than 100 cases. Cells with fewer than 50 cases not shown. Total divorce for which information was complete numbered 5,019 for husbands and 5,009 for wives.
†Other includes Congregational and Jewish.

For the previously married class of divorce actions, both parties had had a prior divorce experience in 35 per cent of the both-Catholic group and 34 per cent of the like-denominations of Protestants. On the whole these figures suggest that *remarried* Catholics are as divorce prone as the average, and hence the Catholic advantage in general marital stability does not hold as well for remarriages.

Children In Divorce

Iowa's new divorce forms ask for three different kinds of information regarding "children": (1) "Number of children by this marriage," (2) "Number of children

TABLE 12

PREVIOUS DIVORCE EXPERIENCE BY RELIGIOUS COMBINATION, DIVORCES IN IOWA, 1953*

Religious Combination	No. of Cases	% of All Divorces: Neither Spouse Previously Divorced	Both Previously Divorced	Either or Both Previously Divorced	% Both Divorced or Either or Both Previously Divorced	% Either or Both Divorced in Remarriages
Total	5,017	52.9	18.7	43.7	42.8	93.3
Both Catholic	259	67.2	12.4	32.5	38.2	93.2
Husband Only Catholic	329	49.1	22.8	50.3	45.3	91.5
Wife Only Catholic	294	49.7	22.6	51.2	44.1	92.7
Both Lutheran	241	63.9	11.1	34.0	(32.4)	(88.1)
Both Methodist	280	63.6	13.9	35.6	38.9	94.7
Both Christian	88	(58.0)	(8.9)	(37.7)	—	—
Both Baptist	96	(50.0)	(26.6)	(46.1)	—	—
Other Same Denomination	133	72.9	10.0	24.1	—	—
Other Mixed Denominations	469	52.5	18.7	46.1	40.5	90.3
Both "Protestant"	1,604	51.5	21.7	47.8	45.5	93.8
Both "None"	85	(50.6)	(24.7)	(54.7)	—	—
"None"-Other	274	44.5	24.7	58.6	42.1	100.0
Other-"None"	99	(30.8)	(34.1)	(73.8)	—	—
Both Not Stated	322	52.5	12.7	29.6	43.0	93.5
Remainder	504	45.2	20.9	51.8	40.2	93.7

*Figures in parentheses are based on less than 100 cases; cells with fewer than 50 cases not shown. Total does not include 175 records on old form.

TABLE 13

CHILDREN REPORTED IN DIVORCES
IOWA, 1953

	Type of Children and Class of Marriage					
	"No. of Children by this Marriage"		"No. of Children Under 18 Affected by Decree"		"How Many of These Children Living at Home"	
	"First" Divorces	Remainder	"First" Divorces	Remainder	"First" Divorces	Remainder
	% With No Children of Specified Type					
No Children	29.6	64.4	30.3	54.6	29.3	55.0
Children Not Stated	1.6	2.3	8.4	11.9	10.2	12.6
Total	31.2	66.7	38.7	66.6	39.5	67.6
Average No. of Children for Those Having Children	2.24	1.99	2.00	1.86	1.99	1.83

TABLE 14

CHILDREN REPORTED IN "FIRST" DIVORCES
BY RELIGIOUS COMBINATIONS, IOWA, 1953

Religious Combination	No. of Cases	% With No Children This Marriage	% With No Children Under 18 Affected by Decree	Average No. Under 18 Years All Families	Average No. Under 18 Years Families With Children
Total	2,656*	31.3	38.7	1.23	1.86
Both Catholic	174	23.0	31.6	1.44	2.10
Husband Only Catholic	162	38.3	43.8	.96	1.70
Wife Only Catholic	146	34.9	40.4	1.25	2.10
Both Lutheran	154	23.4	27.3	1.52	2.09
Both Methodist	178	25.3	38.8	1.26	2.06
Other Same Denomination	196	30.6	39.3	1.20	1.98
Other Mixed Denominations	246	33.3	39.0	1.13	1.86
Both "Protestant"	826	33.3	38.9	1.20	1.96
All "None" Combinations	177	24.9	37.3	1.41	2.25
Both Not Stated	169	34.3	45.0	1.09	1.98
Remainder	228	33.8	42.1	1.18	2.03

*Excluding old forms, 40.8 per cent of which had no children under 18 years.

under 18 affected by decree," and (3) "How many of these children living at home?" Although there has been a presumption that questions regarding "children" in divorces have been reported accurately in the past, cross tabulations of the new data and editing of the records revealed that the responses were not always consistent or clear. Therefore, these data must be considered with some reservation.[7]

Denominationally, the lowest percentage of "childlessness" was found in the both-Lutheran group (27 per cent) followed by the both-Catholic group (32 per cent), with the average number of children in these groups for those with offspring under 18 years of age being the same. As to "children by this marriage" (all ages), both religious groups show only 23 per cent were childless at the time of the divorce. The mixed-Catholic types of "first" divorces had above-average percentages with no children,

[7]The old question, "Number of minor children affected by decree," probably obtained a count only of those children under 18 years, rather than all those who had not reached their legal majority (at age 21 years), which has been assumed in the past. Before we can draw reliable conclusions from divorce data for the United States, the information on children needs a great deal of refinement and improvement. See, Thomas P. Monahan, "Is Childlessness Related to Family Stability?", *American Sociological Review* 20 (August, 1955).

but among divorces in which the wife was the Catholic the average number of children (for those having children under 18 years) was the same as for both-Catholic couples.

It was surprising to find that in the both-Catholic divorce class the average number of children per couple was not much above the average.

Conclusion

At the 1954 meetings of the Public Health Conference on Records and Statistics, the suggestion that an inquiry on religious preference be included on the proposed forms for marriage and divorce registration received a favorable consideration. But, not getting unanimous approval, "Religious preference or denomination" was recommended to the Conference and to state officials as an optional item to be included on the standard form for marriage registration only. If persons who are interested in the statistical concomitants of religious preference would take positive action to further such an objective, and if the religious denominations themselves would lend their support, we could in time achieve an adequate nationwide program of population statistics, as well as marriage and divorce statistics, on the subject. It should be noted that the techniques are at hand which permit a perfectly *anonymous* collection of such demographic data (on a sampling basis, if need be) to which very few people could object.

The Iowa experience is a demonstration of the possibility of gathering such information on religious preference and the way it can be put to use. The continued accumulation of these records should enable us to further clarify our understanding of this important aspect of family life.

HEREDITY COUNSELING
Medical Genetics and Counseling Practices

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Contemporary Status of Medical Genetics

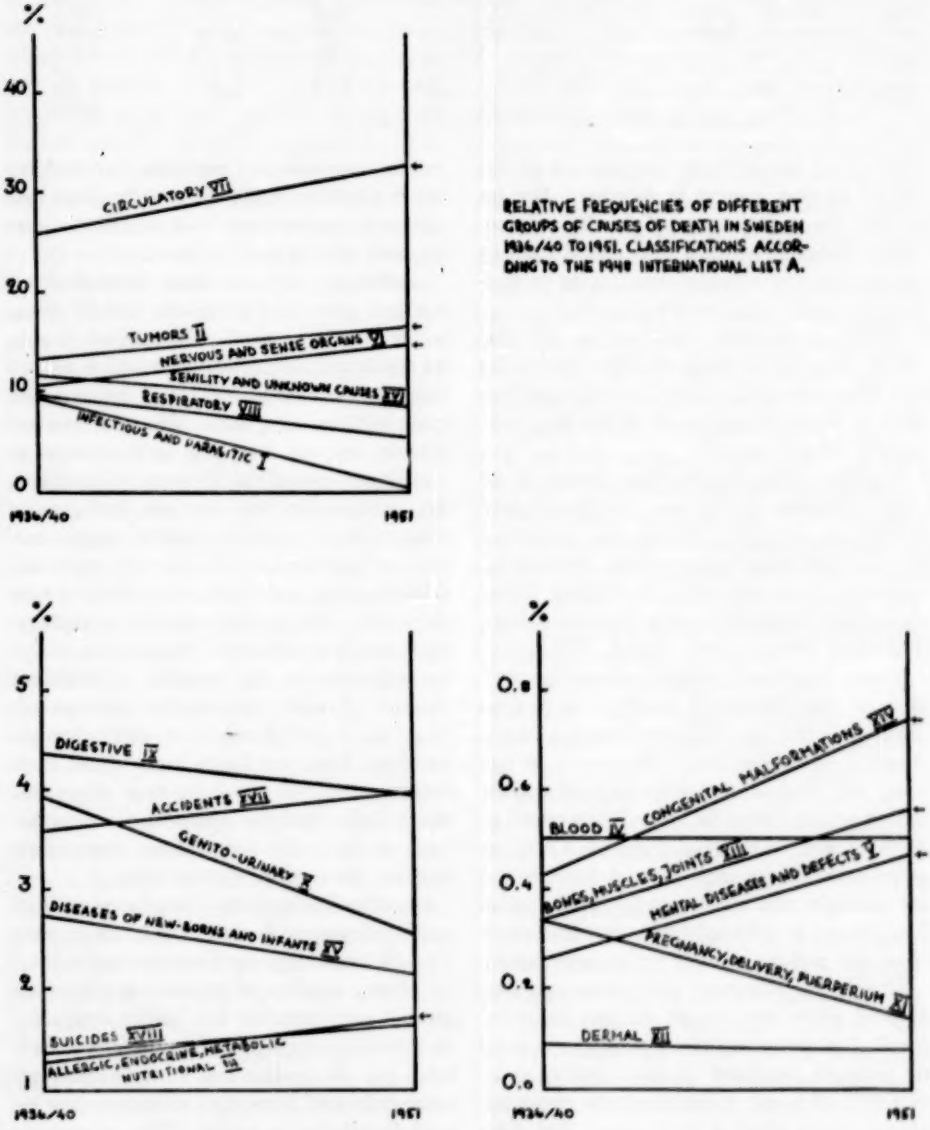
It is certainly a commonplace to say that during the last 50 years a revolution has occurred in the medical treatment of human diseases. The implications of this revolution are manifold. Everybody is now well aware of the immediate consequences of the large-scale use of antibiotics, vitamins, hormones, vaccines, the improvements of sanitation and the control of nutritional deficiencies. Never before in history has medical science been able to restore health and save the lives of such large numbers of individuals. In all advanced countries of the Western hemisphere, the public health situation has changed radically. We have experienced a shift in the relative incidence of those diseases which constitute the major threat against public health. This change, which deserves a special emphasis, is one of the long-range effects of the introduction of a new medical era. Public health work and medical research will gradually become faced with problems that are not new in the sense that we will largely be exposed to new disease entities, but new in the sense that the populations will be exposed to a special category of diseases on a larger scale. It is not necessary to accept this new situation with the old view that the sum of evil will remain constant, but medical research will need a reorientation. In fact, such a reorientation has been under way for several years. However, as it originated outside the medical profession in the biological sciences, it has, no doubt, in many quarters been met with a certain reluctance and a great deal of misunderstanding. We have now to a large extent succeeded in competing with disease-producing agents in the environment, or at least we have the possibility of doing so. In the future, it will be necessary to lay much more emphasis on disease-producing agents and weaknesses that are inherent constituents of the individual. A future medical research and training that does not include genetics on equal terms with bacteriology, virology, biochemistry and environmental medicine will be very unrealistic, and is predisposed to serious drawbacks. It is no longer a matter of trying to get the medical profession interested in genetics. The public will require that something be done about the increase of genetic disorders.

Some indications of the increase of genetic disorders may be extracted from mortality statistics. From 1936/40 to 1951, the general mortality in Sweden decreased from 1,169 to 987 per 100,000 population per year. A classification of the different causes of death according to the 1948 international list A discloses some interesting features which illustrate this point. During this short period of only some 15 years, deaths due to infections and parasitic diseases have decreased from 107 to 28, and respiratory diseases, most of which are due to bacteria or viruses, from 114 to 54 per 100,000 population per year. Table 1 shows some further changes. A satisfactory explanation of these changes is, of course, not possible without detailed studies of individual disease entities, but it appears justifiable to conclude that the trends of increase concern groups of diseases for which genetic factors are of relatively high significance.

Figure 1 illustrates the same trends in

another way by showing the *relative* increase or decrease of the different groups of causes of death in Sweden 1936/40 to 1951. Those groups in which genetic factors appear to contribute significantly have been marked by an arrow.

Reservations have, of course, to be made insofar as the official statistics as yet pay no attention to genetic diseases or defects. One also has to observe that the general conclusion of an increasing importance of genetic disorders has been based on an



RELATIVE FREQUENCIES OF DIFFERENT GROUPS OF CAUSES OF DEATH IN SWEDEN 1936/40 TO 1951. CLASSIFICATIONS ACCORDING TO THE 1948 INTERNATIONAL LIST A.

FIGURE 1

TABLE 1

INCREASE OR DECREASE OF CERTAIN CAUSES OF DEATH IN SWEDEN 1936/40 TO 1951. Classification According to the 1948 International List A. The Figures of Column 1 and 2 per 100,000 Inhabitants Per Year

Causes of Death	1951	Increase (+) or Decrease (—) as compared to 1936/40	
			%
Infectious and Parasitic Diseases	28.3	—78.7	—73.5
Respiratory Diseases	54.3	—59.7	—52.4
Genito-Urinary Diseases	25.3	—20.7	—45.0
Digestive Diseases	39.0	—12.0	—23.5
Mental Diseases and Defects	4.6	+ 1.6	+53.3
Congenital Anomalies	7.3	+ 2.3	+46.0
Tumors	164.6	+ 8.6	+ 5.5
Circulatory Diseases	323.9	+18.9	+ 6.2
Nervous Diseases	146.5	+21.5	+17.2

analysis of the different components of the group as they appear in Sweden. For instance, the major cause of death in group III is diabetes, whereas nutritional diseases in the sense of vitamin deficiencies or starvation hardly exist in this country.

Without further elaboration of this point, however, I think that the tendencies are clear enough to underline the justification of the views expressed in the first paragraphs of this paper.

Similar changes have been observed in other Western countries. In the United States, for example, deaths due to pneumonia, influenza, tuberculosis, diphtheria, typhoid fever and other intestinal infections have been reduced to approximately 1/8 from 1900 to 1947 (Neel, 1951).

Some important changes are under way due to the increasing number of people who reach old age. This means that a larger number of individuals will survive to become the victims of those genetic disorders which appear later in life. This trend is perhaps most obvious in the field of certain genetically determined mental diseases as, for example, the major psychoses (the clinical groups of schizophrenia, manic-depressives and various types of senile psychoses).

During the relatively short time that has elapsed since the turn of the last century, medical genetics has developed from a sort of pedigree curiosity of rare defects to a vast field of research that basically concerns almost every clinical discipline. But few medical schools and research centers have as yet wholeheartedly opened the gates and accepted the necessary and practical consequences of this development.

Although much has been learned about medical genetics during the last 50 years, we are badly in need of organized attacks on the important issues with which we are faced today. Some of these concern the epidemiology of genetic diseases. *Severe* genetic diseases and defects disable some 5 to 10 per cent of the Western populations. Yet, even today, one does not find genetic diseases mentioned in epidemiologic surveys or handbooks. We need more information about gene action in terms of biochemistry and developmental pathology. Only the first steps have been taken in the investigation of the genetics of common diseases. Genetic analyses will undoubtedly reveal a vast number of new etiologic entities. Until we know more about such entities, the analysis of the type of genetic transmission and the distribution of pathologic genes in the populations must often remain more or less speculative.

Genetics has opened a large new field of medical research, but already at our present level of knowledge we have reached a period when a number of practical applications are not only possible but highly desirable. In the following we will consider one such field, *viz.* the estimation of individual genetic risks and how such estimates may be used in clinical practice. The expression

"genetic counseling" has now been generally accepted to specify such practical procedures.

Basic Elements of Counseling

Genetic counseling is based on a thorough knowledge of general genetics and more specifically of the genetic features of individual morbid entities. Although the principles are easily understood, counseling can be learned only by serious studies and experience. Its practice, to be professionally acceptable, should be reserved for the specialist in medical genetics. The patient or family who wants such advice should, together with a full history and details of the clinical examinations, be referred to the medical geneticist. Further clinical studies or evaluations of individual family members, which may prove necessary, should be carried out in collaboration with the clinician, but the responsibility of the genetic interpretations and the explanations should always lie with the medical geneticist. This requirement appears desirable and necessary as there are no cookbook answers to the problems of genetic counseling. Medical genetics is a specialty and should remain so. It is neither desirable nor practical to require that every clinician should specialize in this field. On the other hand, it is necessary for him to have some knowledge of general principles and to be informed about how much and what kind of assistance he may expect from the medical geneticist. In this paper I intend to give some such general information.

I have deliberately used the expression *medical* geneticist. A specialist in this field should, besides his M.D., have at least a basic university degree in general genetics, three years' training in a recognized center for human or medical genetics and an additional two years' training in optional clinical departments.

How human geneticists who are not physicians should be incorporated in counseling procedures is a problem that we have not, so far, been faced with in Europe. Here human genetics, with few exceptions, has been developed by physicians and not by geneticists, as largely has been the case in the United States. Perhaps this should create no problems at all, as *human* geneticists could collaborate with the clinicians on similar terms as, *e.g.* clinical psychologists collaborate with psychiatrists. In any case, to make the distinction clear, I suggest the expression *medical* geneticist for a physician specializing in genetics and *human* geneticist for a Ph.D. in genetics who is specializing in the human field.

Basically, the object of genetic counseling should be to give information about the nature of genetic diseases and defects and to explain the risk a specific individual may run of contracting such a disorder. For clinical or private patients, specific advice should, in general, be avoided. Counseling or decisions about the desirability of children is, of course, a highly personal matter. Some patients will consider a risk of 10 per cent high, others negligible. Many patients will stress this point as they have been accustomed to specific advice from doctors which has to be followed in detail. The counselor may to some extent solve this dilemma by explaining what decision he himself would make under similar circumstances, but stressing that personal matters influence his decision as well as do cold figures.

Quite often parents who have a child with some congenital malformation of obscure etiology or some genetic disease fear that the same disaster will be repeated in *all* subsequent children, and may suffer mentally from a feeling of guilt or inferiority. In such cases, information given by the experienced medical geneticist is the rational psychotherapy.

In some countries, as *e.g.* in Scandinavia, where sterilization and abortion on genetic grounds is regulated by law, another aspect of counseling enters the picture. In Sweden, such operations are in principle optional and will be granted by a special committee of the Royal Medical Board only on request and after rigorous control of

the premises. However, in this controlling procedure will enter also the broader aspect of the desirability of the reproduction of individuals affected with certain genetic diseases or carriers of corresponding genes. In such cases, it should be noted that the individual concerned has already made a decision of his own by applying for sterilization after receiving genetic information. In other cases, sterilization cannot be strictly voluntary. Applications may be made by guardians of individuals who, due to mental disease or defect, are incapable of judgment in a legal sense. The total responsibility of granting or rejecting a sterilization then rests on the above-mentioned committee.

The idea that eugenic sterilization or abortion would substantially decrease the load of genetic disorders has, of course, since long been abandoned. Still these operations are of definite value for individuals who do not want to or cannot use other methods of birth control. The medical geneticist of the committee scrutinizes the genetic material of the application and makes a decision in regard to the justification of granting abortion or sterilization on such grounds. It should perhaps be mentioned that these operations seldom are granted on genetic reasons exclusively, but rather on mixed genetic, social and medical grounds. For example, the largest number of sterilizations concern mentally defective individuals where the major reason is that they are not very well fitted to raise children.

Genetic counseling, in a wide sense, consequently has its individual as well as medico-social aspects. The latter are concerned with the genetic risks for larger groups of people and how these risks can be met by public information, legislature, changes of the environment and other procedures. This field of activity, which could be called epidemiologic control of genetic disorders, has hardly been touched upon yet insofar as public health organization and planning are concerned. I should like to make perfectly clear that such undertakings have practically nothing in common with previous so-called eugenic movements, the most outstanding effect of which has been to discredit medical genetics. In all Western countries, I consider it a first-rate desideratum that experts of medical genetics participate in public health work.

The increasing importance of genetic disorders and the fact that approximately one individual out of ten is exposed to appreciable risks of disease, severe disability or death primarily due to genetic dysfunction also make it highly desirable that international organizations, *e.g.* WHO, start some serious thinking about these problems. The practising physician will, perhaps, take a greater interest in the individual aspects of counseling as his immediate concern should be his patients and their welfare. To explain such counseling, one may, schematically, separate theoretic and empiric risks.

Theoretic Evaluation of Genetic Risks

This simply implies the use of Mendelian principles to calculate the probability that an individual will inherit a specific morbid gene. The practical application of this method still has severe shortcomings of which the most important are that it requires:

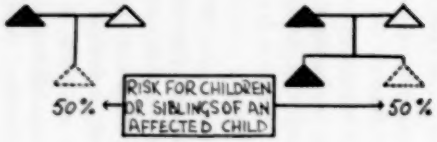
(1) monogenic inheritance
(2) adequate diagnostics referable to the genotypic level
(3) reliability in separating different genetic entities which superficially may impose as the same clinical disease
(4) age-independent diagnosis or adequate knowledge of the variation in the age of onset

Unfortunately, these conditions are rarely fulfilled, but considerable advances may be expected in the future as our knowledge pertinent to (2) and (3) improves.

Figure 2 has been constructed to demonstrate some common examples of theoretic risks. It should be observed that the pre-

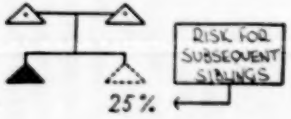
DOMINANT

ONE PARENT DISPLAYING A RARE (1% OR LESS) SIMPLE DOM. DISORDER WITH COMPLETE PENETRANCE.

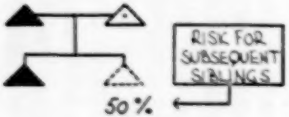


RECESSIVE

BOTH PARENTS NORMAL BUT CARRIERS OF ONE SIMPLE REC. MORBID GENE WITH COMPLETE PENETRANCE IN DOUBLE DOSE AS SHOWN BY THE APPEARANCE OF AN AFFECTED CHILD.



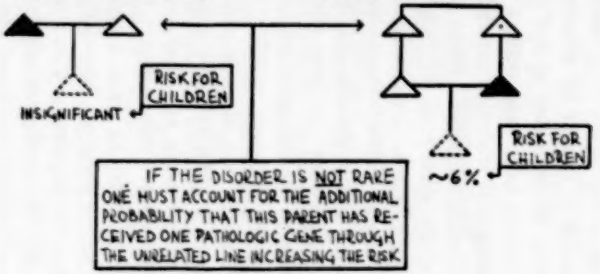
ONE PARENT DISPLAYING A SIMPLE REC. DISORDER WITH COMPLETE PENETRANCE THE OTHER NORMAL BUT A CARRIER OF ONE IDENTICAL MORBID GENE AS SHOWN BY THE APPEARANCE OF A SIMILARLY AFFECTED CHILD.



ONE PARENT DISPLAYING A RARE (1% OR LESS) SIMPLE REC. DISORDER WITH COMPLETE PENETRANCE THE OTHER PARENT NORMAL.

A. UNRELATED PARENTS

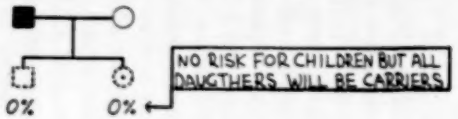
B. PARENTS 1ST COUSINS


INSIGNIFICANT
RISK FOR CHILDREN
~6%
RISK FOR CHILDREN
IF THE DISORDER IS NOT RARE ONE MUST ACCOUNT FOR THE ADDITIONAL PROBABILITY THAT THIS PARENT HAS RECEIVED ONE PATHOLOGIC GENE THROUGH THE UNRELATED LINE INCREASING THE RISK.

SEXLINKED SIMPLE RECESSIVE

(COMPLETE PENETRANCE)

MALE PARENT AFFECTED WITH A RARE DISORDER.



BOTH PARENTS NORMAL BUT THE WIFE A CARRIER AS SHOWN BY THE APPEARANCE OF AN AFFECTED BOY.

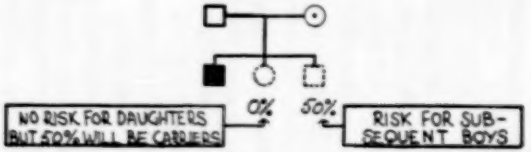


FIGURE 2

dictions are valid only if the premises given in the text are fulfilled. In every case, it will, of course, be necessary to examine the parents and siblings and highly desirable to collect as much objective data as possible about other relatives.

Some actual examples

I. A 36-year-old woman with a 4-year-old boy who at the age of 6 months had been diagnosed as a *chondrodystrophic dwarf* in an orthopedic clinic inquired about the risk of having another similarly affected child. Neither of the parents were dwarfs. Without further investigations, one would have given the following information: This is apparently a case of genetic chondrodystrophy known to be due to a dominant pathologic gene. The majority of the chondrodystrophics are new mutations and therefore have normal parents and siblings. The mutation frequency is approximately 1/100,000 newborns. The risk of having another similarly affected child should be the same as the mutation frequency, or negligible.

However, a closer examination of the family revealed important complications which made the above conclusion invalid. The parents, who were first cousins, both had a short stature and displayed skeletal disproportions suggestive of a slight or moderate chondrohypoplasia. This trait, which had no clinical significance, was found in two younger sisters of the patient (there were no further siblings) and could be followed as due to a simple dominant gene with complete penetrance when the pedigree was extended. Now the following interpretation appeared more likely. The patient apparently is homozygous for a rare dominant gene, the heterozygous expression of which is only slight or moderate skeletal disturbances. As both parents are heterozygotes for the same gene, the risk for homozygosity and gross disturbances for each child is one in four.

This case demonstrates the necessity of regarding each counseling procedure as having its individual properties. There is certainly some difference between giving the parents a risk figure of 1/100,000 and 1/4, although it should be admitted that probably in 99 cases out of 100 the first estimate would have been correct.

II. A young lady wishes to marry her first cousin. One of her sisters, who married a resident of the same rural district, has two children, one of whom was recently diagnosed as a case of *juvenile amaurotic idiocy*. She inquired about the risk that her children would contract the same disease.

According to the extensive investigations in Sweden by Sjögren (1931), juvenile amaurotic idiocy is a clinical and genetic entity due to a single recessive gene difference. The frequency of the gene lies between 1/100 and 1/250 but may be even higher than 1/100 in certain geographic isolates. As the sister is a heterozygote, the chance that the inquirer is also a heterozygote is 1/2. The coefficient of relation between first cousins is 1/8 and the chance that both partners of the planned marriage will be heterozygotes is 1/16. Consequently, the theoretic risk for the children is 1/64. Naturally, if it should happen that the couple has one child with the disease, the risk for subsequent children will increase to 1/4 as the heterozygosity of both partners is then certain. In case the inquirer marries an unrelated man, the risk for the children is between 1/400 and 1/1,000.

Empiric Risk Figures

In most cases that occur in the practice of a counselor in medical genetics, the type of inheritance is not sufficiently understood or sometimes one cannot even be sure that genetic factors are of decisive importance. Furthermore, the question of the genetic homogeneity of most clinical disorders will add to the complexity. Pending further investigations about the details of the genetic background, which will require long-term projects for every disorder, there has been only one way to get useful informa-

TABLE 2
EMPIRIC RISK FIGURES FOR A NUMBER OF GENETIC OR SUPPOSEDLY GENETIC DISEASES AND DEFECTS

Diseases or Defect	*Approximate Frequency Among Newborns or Morbid Risk*	*Risk for Sibs. Parents Unaffected.* %	*Risk for Sibs One Parent Affected* %	*Risk for Children of One Affected Parent* %
Anencephaly	1:1,000	1		
Chondrodystrophy	1:10,000	0.01	50	50
Cleft Palate Alone	1:2,500	2–12	17	7
Congenital Cataract with Idiocy	1:50,000	15		
Congenital Clubfoot	1:1,000	3	10	10
Congenital Luxation of the Hip	1:1,500	5	10–15	10
Convulsive Disorders (Grand Mal)	1:300	2–4		3–6
Diabetes Mellitus (Appearing before the age of 50)	1:200	15–20		10–15
Harelip or Harelip Combined with Cleft Palate	1:1,000	4	14	2
Hydrocephaly	1:1,000	1		
Imbecility or Feeblemindedness (Unspecified)	1:100	15–18	30–40	30
Malformations of the CNS	1:200	3		
Manic-Depressive Psychosis	1:100	15	15	15
Microphthalmus or Anophthalmus with Idiocy	1:100,000	10		
Mongoloid Idiocy	1:700	1–4		
Pyloric Stenosis	1:250	5		
Schizophrenia	1.0-1.5:100	10–15	10–15	10–15
Spina Bifida	1:1,000	1		
Strabismus	1:50	10	17	

tion. For a very large number of clinical disorders, many of which are quite common, twin and family research, together with careful studies of the environmental conditions under which a specific disorder may develop, have shown that genetic factors contribute significantly to the etiology. This contribution, of course, varies considerably and in some cases its practical significance may be doubted. However, so far it has not been possible to extract unambiguous information from these data about the mechanism of inheritance. Therefore, for practical purposes, one has to be content with empiric risk figures which should be regarded only as temporary substitutes. To obtain such figures, certain principles of collecting the data must be strictly followed. The index cases or *propositi*, must represent the same clearly defined clinical entity and constitute a random sample. The family members must as far as possible have been professionally examined. Then the morbid risks which can be calculated for children, siblings and other relatives may be used as reasonable estimates in actual counseling.

By the use of this procedure, a number of known pitfalls are avoided; but there are many complications which, at our present level of knowledge, cannot be taken care of. The only counselor who is able to select the most reasonable prediction is the trained medical geneticist.

Some actual examples

1. A 55-year-old man presents the following problem. He has two sons aged 25 and 19 by his wife who is now 50. The older son developed a *schizophrenic psychosis* at the age of 21 and since that time has been in a mental hospital. The younger son, who has an excellent school record, now wants to go to a university to study law. His father wants to know what the chances are that also this son will contract schizophrenia and if the stress of higher studies is likely to influence these chances.

The investigation confirmed a diagnosis of catatonic schizophrenia for the older son. Among close relatives, no further cases of schizophrenia were revealed. Neither parent displayed any gross psychopathology. The mother was a shy, somewhat sus-

picious and rather self-occupied person with hypochondric tendencies. She had had some short neurotic episodes in her twenties. The younger son was an ambitious but rather introvert person with some further moderately expressed schizoid features. His IQ was 135. He had no history of mental illness or adaptational difficulties.

An individual does not contract a schizophrenic psychosis unless he has inherited specific genetic potentialities. There is at present no general agreement whether these potentialities are inherited from one or both parents. Besides heredity, other yet unknown factors, probably environmental and in the form of stress, must coincide to cause the disease. Most cases of schizophrenia occur between the age of 15–50 years. Consequently, the chances that the parents will contract the disease are slight. It is justified to regard the mating as one between two non-psychotic individuals. Under such circumstances, the empiric risk for a sibling of a schizophrenic has been found to be approximately 10 per cent, provided he lives to be 50 years old. The corresponding risk for a random individual in the Swedish population is approximately 1 per cent. It is possible that the mental characteristics of the mother and the younger son indicate a genetic susceptibility for schizophrenia or neurotic illness related to this disease. This might increase the abovementioned risk but, again, there is no general agreement on this point. On the other hand, there are no findings which indicate that in this case the risk should be less than 10 per cent. The figure of 10 per cent is an average risk calculated empirically from a large amount of material on families of this same type. One must always make the reservation that an individual family occasionally may represent an exception. Finally we don't know in what way university studies would influence the risk.

II. A 28-year-old woman married to an unrelated man had one spontaneous abortion, one normal and healthy girl and now a stillborn girl with *anencephaly* and *spina bifida*. There are no pathological findings on the parents or the living girl. No other cases of malformations have occurred among the relatives known to the informant. The gynecologist asks what the chances are that this woman by the same husband will have (1) another child with anencephaly, (2) another child with a malformation of the central nervous system irrespective of type.

The general morbid risk of anencephaly with or without spina bifida (which here equals the incidence among newborns) in Sweden is approximately 1/1,000, with a slight preponderance for females. Investigations here and abroad indicate that the repeat risk for siblings is in the neighborhood of 1 per cent. There is no proof that all cases of anencephaly biologically represent the same thing. There is reason to suspect that this defect may be caused by pathologic genes as well as by non-genetic factors. In a Swedish series (Böök and Rayner, 1950), the empiric risk of spontaneous abortions in sibships with an anencephalic was increased to about 20 per cent. We have reason to suspect that some of these abortions may concern embryos with central nervous system malformations. This possibility seems worth consideration in planning of the treatment of threatened abortion when the patient has had an anencephalic child.

The total general morbid risk for all CNS-malformations in Sweden is approximately 1/500. Investigations in Great Britain indicate that this compound risk for siblings of anencephalics is 2 to 7 per cent. All the risk figures given here are purely empiric and derived from series of unselected families. A specific family may, of course, represent an exception.

In Table 2 a number of empiric risk figures have been summarized to exemplify the approximate risk involved for different disorders. These are all figures which I have found useful for counseling in Sweden.

They should not be taken too literally, but rather as indicating the magnitude of the average risk. Furthermore, they should not be used without due consideration of the complexities of genetic counseling as outlined earlier in this paper.

Conclusions

By now there are several centers with counseling services in the United States and the Scandinavian countries. They have all started on a modest scale. The general experience has been that these centers have met with increasing interest by the public as well as by clinical colleagues. As knowledge of these genetic clinics and the kind of services they can supply has spread among physicians and the public, the number of private inquiries and referred clinical patients has increased rapidly. Therefore, it seems certain that these services meet a rather extensive latent need for sound professional information on genetics.

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BOOK REVIEWS

Cultural Anthropology: Melville Herskovitz, Alfred A. Knopf, New York, 1955, 569 pp.

As shown by its subtitle this is an abridged edition of the same author's *Man and His Works* (1948). Though designed primarily as a text it should attract a wider public for several reasons. Its subject matter is of great human interest; its style is clear; its development is logical; it is relatively free of both theoretical dogmatisms and scientific technicalities; and it has an abundance of illustrative ethnological materials and excellent photographs. Basically descriptive, it broaches a number of theoretical problems, most of which are treated in balanced pro-and-con form, some of which are limited to indoctrinations of the Boas school of thought, and some of which are skimmed over with a light but far from decisive touch. Covering a very wide range of current ethnological findings, this is certainly one of the best introductions to its field. In what follows we limit ourselves to matters directly or remotely related to eugenic issues. These are primarily racial differences, relations of race and culture, and certain moot points in the theory of cultural development.

The two chapters on races dealing with the evolution of man from earliest known fossil types to modern man and with modern racial differentiation are too brief for more than cursory treatment. Neither chapter uses the terms geographic isolation or mutation. While the author stresses the "consistency of change" toward larger size in the evolution of cranial capacity, he nowhere notes the considerable differences in this respect among modern racial types. One also wonders why 1400cc is given for the cranial capacity of Neanderthal man and 1300cc for "modern man." Which "modern" is this? An average of all extant types may conceal considerable differences among them. The author notes (27) that not all students of these matters class all modern races in the same species.

The chapter on existing racial differentiations is extremely sketchy. Mutation, geographic isolation and climatic selection as factors are neglected. In his discussion of the "breeding isolate" he consequently omits the fact that entire groups may be such and not merely family lines. While the extensive crossing of racial types is rightly emphasized, the problem of racial differentiation seems to be confused with variability in genetic composition within a given population. These are different

issues. Moreover, the development of the author's position is far from clear. Using the method of Boas, he posits that the variability of a population is measured by family variability (between families) plus fraternal variability (within families). He correctly notes that inbreeding results in lower variability in both cases, thus resulting in greater homogeneity. (70) Yet he concludes: "If, in racial terms, the derivation is from one stock, variations will be less in the group of racially mixed ancestry, which can draw on a wider range of determiners, than in a racially mixed group." (73) How can a population be of one stock and yet racially mixed? And how, being thus mixed, can they prove themselves more homogeneous than a racially unmixed stock?

Then the author repeats the cliché that the range of differences within a racial group exceeds the average difference between such groups. But what should one expect, especially if the groups belong to the same species and are highly hybridized? Johannsen's pure lines followed the same rule. Phenotypic measurements of the varieties of any species seem certain to do likewise, if hybridized and the measurements refer to gross anatomical traits such as weight, height, breadth and so on. This cliché served a useful purpose in helping to reduce the silly exaggerations of the racists, but it can now be recognized for what it is, a statement of the obvious.

The relation of physical type to culture has two aspects: the effect of culture on type and vice versa. The author has some excellent things to say of the ways in which domestication and social selection have affected race type, though his factual data are limited. His claim that the American Negro has about the same homogeneity as the Blue Ridge mountaineer needs further verification (70 and 83). He seems to think social selection is "non-biological" (79), but he uses it as synonymous with Darwin's sexual selection. In the sense that it affects survival rates it is a subhead under natural selection. There is no discussion of the possible deleterious effects of modern science and humanitarianism in preserving individuals with genetic defects and fitting them for parenthood.

On the effects of physical type on cultural development the position taken is substantially the UNESCO Statement that present evidence "does not justify the conclusion that inherited genetic differences are a *major factor* [reviewer's italics] in producing differences in cultural development." (89) The author finds that one cannot say that physical type has no effect on culture; and adds: "any normal human being, *if given the necessary opportunity*, [author's italics] can learn the way of life of any people existing." (88) Previously (83) he had stated that "*culture influences physical type far more than physical type influences culture.* [author's italics] His position thus avoids dogmatic extremes. One readily recalls that in the violent emotional reaction against Nazi excesses there were not a few who declared all races clearly equal in cultural capacities. These were outdone by those who were quite certain there is no such thing as race and that the word should be abolished.

However, a few comments are called for. The italicized dictum above is by no means demonstrated by any evidence here presented; it may be true of some of the major divisions of mankind today, but how it can be proven is something of a puzzle; if one views the entire history of man from fossil-eolithic to Homo sapiens, the dictum becomes extremely doubtful. As to opportunity, it is clear that it is essential for any specific cultural development, since the existing state of culture is a major factor in its further evolution. However, what is opportunity for one individual—and *perhaps* for race type—may not be for another. The talented and forceful find opportunity where the dull and submissive find none. As Lowie pointed out some years ago, small differences in average abilities between groups may make great differences in cul-

tural achievement, because of the great differences in numbers of highly talented persons.

Moreover, the fact that any normal person can learn to live in any culture is of little significance in this connection. Millions of normal persons live comfortably and happily in our own culture with little or no comprehension of its scientific, technological, political or philosophical complexities, to say nothing of making creative contributions thereto. The differences between racial types revealed by past studies were rationalized away on the ground of differences in antecedent culture, and the reaction to the exaggerations of the racists made the rationalization acceptable. The culture drift or the *Zeitgeist* concurrent with the ground swell of mass influences driving western nations away from nineteenth century individualism toward the socialistic preferences of today required the denigration of all claims of inherent individual or group superiorities and the explanation of differences in achievement on the grounds of special opportunities.

Moreover, the recent entrance of numerous nationality and racial groups onto the world stage and the notable advances of the colored peoples everywhere in cultural aspirations and achievements has removed the question of racial superiorities and inferiorities almost entirely from the realm of practical politics. Democratic theory and to a large extent also practice accords equality of political and civic rights regardless of equality in genetic traits. And so great is the overlapping in both mental and physical traits that no line of demarcation can be found separating one racial type entirely from another as recipients of such rights. Finally it has become clear to all observers that a nation profits most when it cultivates to the utmost the latent capacities of all elements in its population. Thus one wonders whether the question of racial differences and their relation to cultural development may not have become a dead issue, no longer expedient and withal bootless to determine. If so, it will not be the first social issue settled by a change in the climate of opinion.

Theoretical issues would still remain of interest to the scientist. One of these is raised by the author's statement that the question of racial differences in cultural abilities "is outside the limits of scientific concern, since the question is essentially one of valuation. As a matter of fact, it is a problem of the same order as that of cultural evaluation." (90) That is, there is no way to measure racial differences in cultural abilities except by their cultural achievements, but there is no way to judge one culture superior to another. Elsewhere (357) the author admits that in technology superior development may be proven but finds other differences reducible to value judgments for which there is no acceptable universal criterion. In fact, the author seems to find all cultures equally meritorious and the idea of "progress" an illusion of the mores. (357 and 437) When, however, he cites as proof the fact that every people prefers its own customary diet, he is on slippery ground. The fact that the Hindu doesn't like beef proves only the force of custom; the superiority of one diet over another can be proven only by the science of dietetics; it is not a matter of habitual taste. In fact, the author takes no account whatever of the contributions of science to ways of living.

Thus the author's extreme cultural relativism leaves us no choice between the life of the Australian aborigine and our own. This is surely an untenable position. Culture is a buffer between man and fate, and a culture equipped with scientific knowledge is as much superior to that of the preliterates as modern medicine is to the quackery of the witch doctor. The fact that many values are incommensurable does not mean that there are no values which the majority of men most of the time cherish, such as longer life, better health, greater security, regular meals and more personal comfort, as well as such intangibles as

mutual understanding, friendship and social acceptance and recognition. It would seem that cultural anthropology as a scientific and comparative study of cultures, aided by other social sciences and abetted by a possible science of ethics, might some day discover a scheme of values of very wide if not universal validity. In any case, if there is any value of universal validity it would seem to be the search for truth by the rational empirical methods and spirit of science. If this is not superior to the promotion of economic, political and religious myths by violence, intimidation and intolerant indoctrination then surely all values are of equal merit and we are of all men the most miserable because we have no lodestar to guide our efforts to improve the lot of mankind. Even this may not succeed; the scientific era may end; but while it lasts we are not left helpless and without hope.

The theory of complete cultural relativism has recently enjoyed a wide vogue. Like the rationalization of all evidences of racial- and one may add class-differences in cultural abilities, its vogue is in harmony with the somewhat mysterious and even mystical "spirit of the times," the culture drift, and an evidence of the power of what Goldenweiser once called "the social compulsives of thought." Which is not to say that its partial rejection has anything to do with relative racial endowments. One may note, however, that as all major cultures trend toward greater unity through adoption of the scientific, industrial technology, the tests of such endowments may sooner or later be ability to contribute creatively to that culture stream which rests on the mastery of the intricacies of mathematics and modern science.

The author's discussion of the nature of culture, its structure and dynamics is surely an excellent introduction to a highly complex field but fails to leave clear impressions on some points. His discussion of law and prediction is especially unsatisfactory. He confuses generalizations of the most simple and obvious sort with scientific laws. He envisages prediction of individual behavior only, while culture is the product of the interaction of many minds and nowadays is affected by world-wide conditions. Orderly social life requires a high degree of predictibility of individual behavior, but this is a far cry from prediction of the next great discovery or invention, the next crisis or war, or the next epoch in cultural evolution. Culture trends are, however, determinable. Projections from them on the basis of reasoned assumptions, none of which may prove exactly correct, are extremely valuable as guides for public policies of control and adjustment.

We come then, finally, to the controversy between those who find culture to be superorganic, that is, a self-generating, independently evolving emergent and those who would reduce it in its entirety to expressions of human psychology. The author favors the latter view, mainly on the ground that culture and also society seem to him reifications of mere concepts. Here he is not entirely convincing. He defines society as "an organized, interacting aggregation of individuals" (315-7, 502), and says of culture: "it has a vitality that transcends the life of any member of the group that manifests it." Nevertheless, to objectify culture is to posit "a separate existence for something that exists only in the mind of the student." (312) While noting certain plausibilities in the superorganic view which places culture as the final emergent in the evolutionary filiation from inorganic through organic, psychic and social to cultural, he rejects the idea of cultural reality. Nevertheless he admits the heuristic value for purposes of study of proceeding *"as if* it had an objective existence." (315)

This position is something of a straddle, but it is far less dogmatic than that of the extremists of either school. The early superorganic view was sometimes so stated that its human base quite vanished from the picture. Kroeber posited that abilities of all types and grades are evenly distribu-

ted through different populations and in the same population at different epochs. Leslie White more recently has declared that in the man-culture equation man is the dependent and culture the independent variable; and that "No amount of development of the social sciences would increase or perfect man's control over civilization by one iota." ("Man's Control over Civilization: An Anthropological Illusion," *Sci. Mon.*, 66, Mar. 1948; see also his *The Science of Culture; A Study of Man and Civilization*, 1949) Neither of these two positions leaves any place for eugenics.

However, there seems to be some convergence toward the position taken by David Bidney (*Theoretical Anthropology*, 1953, 136) that both organic and superorganic factors "must both be recognized as integral elements in the cultural process." So long as one admits that culture is an expression of human mental and emotional potentialities—and no one really denies it, since all admit that culture is a peculiarly human product—then he cannot deny that the quality of the human element is important for the future development of culture.

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WIRKSAME FAKTOREN IM LEBEN DES MENSCHEN (Factors Which Determine the Course of Human Lives): Otmar Frhr. von Verschuer, Wiesbaden, Franz Steiner, 1954, 288 pp.

In this monograph one of the veterans of twin research presents the results of a unique, and his most ambitious, study. Never before has a large sample of normal twins been studied for so long. The report concerns 150 pairs of same-sex twins, 100 monozygotic and 50 dizygotic, whom he followed over a 25-year period beginning at an average age of 16. The author summarizes the life histories of these twins first individually and then statistically, and draws a number of significant qualitative conclusions.

Among the 300 twin subjects, von Verschuer recorded 70 deaths in the 25-year interval. With respect to the causes, there was almost no concordance in either identical or fraternal twins, and this was true even of such diseases as tuberculosis, multiple sclerosis and syringomyelia. There was also no significant tendency for the twin partners to die at about the same age; average survival of one twin after the other's death was found to be no shorter among the identical than among the fraternal twins. However, 52 of the deaths were prior to the age of 45, and 29 male deaths occurred in the war; as Verschuer points out, these findings represent presenile deaths and can scarcely be compared with Kallmann's study of longevity in twins who passed the 60-year mark. Even as a sample of abnormal or premature deaths, these cases are too few to warrant definite conclusions.

The medical histories include a large number of diseases, both common and rare. With these, as with causes of death, concordance was the exception in both monozygotic and dizygotic pairs. Thus, tuberculosis occurred in four pairs of identical and three pairs of fraternal twins; in each group only one pair had two affected members. Even when one member of a monozygotic pair had rheumatic fever, asthma or psoriasis, diseases in which heredity has been considered important, the partner was generally free of the disease. Although the numbers are disappointingly small within each diagnosis, the study as a whole casts some doubt on the importance of hereditary susceptibility in the epidemiology of the common major diseases. On the other hand, concordance or discordance with respect to disease was found to bear no relationship to similarity or dissimilarity in social, economic and geographical environment.

For the last two reasons, Verschuer is led to challenge the conventional dichotomy of heredity *versus* environment. He suggests that "chance" is the only explanation we can give for many important events in life,

and that chance should therefore be distinguished from the environmental influences that we can identify and, conceivably, control. This point of view may be of some use to those investigating the practical relevance of environment in disease and personality. In the opinion of the reviewer, since there is no sharp line between "pure chance" and the known environment, most investigations will continue to recognize as the primary dichotomy that between hereditary and non-hereditary influences.

Several other observations are of more than passing interest. Unlike diseases, body-weight differences between monozygotic twin partners could be almost entirely related to obvious factors, namely (1) living conditions, (2) serious illnesses and (3) in the case of females, childbearing. Also, of all the twins studied, the female monozygotic twins had the lowest marriage rate and those who married seemed to have subnormal reproductive capacities, on the average.

While it is generally recognized that the relative contributions of heredity and environment vary from one trait or disease to another, Verschuer emphasizes that their relative contributions to one trait may also vary from one person to another. In other words, conclusions about the dependence of a trait on heredity and environment, even when based on large numbers of subjects, can have complete validity only within the racial and cultural group sampled, but even among them such generalizations may have no application in individual case histories.

Verschuer suggests that, in different kinds of persons, heredity may play three different roles in personality formation. In what he considers the primitive or simplest type of person, heredity leaves complete freedom for shaping of the personality by environment. On a higher level he places a type of person whose heredity determines the personality almost completely without dependence on ordinary environmental variations. In the case of the most highly developed minds, he supposes that heredity provides several alternative paths of development, permitting the environment to select the path taken, but beyond this leaving little room for environmental effects. This classification is not based on objective data and would hardly stand up to rigorous criticism, but it may be one useful way of approaching the question.

Aside from the most general observations, a pioneer study of this kind can teach more from its shortcomings than from its positive findings. In the planning of future long-term twin studies on comparable lines, it will behoove every investigator to examine this monograph closely. Each may find new or different points to improve upon. It is to be hoped, for instance, that future twin studies collectively if not individually, will better satisfy the following requirements: (1) numbers sufficient to provide quantitative statistical information; (2) random selection of cases, with thorough specification of the population sampled and of the biases introduced in sampling; (3) utilization of efficient, adequate and standardized criteria of zygosity; (4) observations of the subjects during their earliest formative years, and (5) cooperation of multiple disciplines: psychological, sociological, and biochemical as well as medical and anthropometric. However, before any investigator tries to improve on the work of Verschuer he will need to overcome the many great practical problems that complicate such a study and of which Verschuer makes no mention.

As a pioneer study, this monograph deserves close attention in every research center where twin investigations are contemplated or in progress.

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PERIODICAL ABSTRACTS

GENETICS

Genetic damage produced by Radiation. H. J. Muller. *Science* **121** (1955), pp. 837–840.

The genetic damage resulting from nuclear explosions up to the present time is certainly real, but it should not be regarded with so much concern as that resulting from relaxation of natural selection in our present civilization.

The very slight indications of permanent genetic damage following the atomic bombing of Hiroshima and Nagasaki do not in any way refute the well-grounded belief of geneticists that these bombings produced a great number of deleterious mutations. It is probable that, on the average, each child born to survivors of the bombings carries about one new mutation. For the most part these mutations will be evident only at the time they are eliminated by death or infertility of occasional persons who inherit them. This process will extend over many generations and is expected mainly to go unnoticed.

It is likely that a similar number of mutations have been induced in Americans by the test explosions already conducted, but these mutations, also, will be expressed sporadically over many generations and in a large population. The normal load of mutations carried by the American population before the first nuclear explosion was at least 100 times as large, so that the increment will have no observable consequences. Probably more mutations are produced annually in the American population by the medical use of X-rays than have resulted to-date from all test explosions. Since the medically-induced mutations could be largely prevented by simple precautions, they are much more difficult to justify than the atomic tests. This is especially true if we consider the totalitarian world we might now be living in if we had refrained from developing our nuclear weapons.

Again, the relaxation of natural selection achieved by modern medical, industrial and social techniques deserves as much attention as the hazards of nuclear explosions. This will probably add more mutations in the next eight generations than would result from exposing every American now alive to the amount of radiation received by the average Hiroshima survivor. The only complete defense against the future consequences of accumulating mutations is a higher conception of our duties to subsequent generations. "The saving of a life does not automatically justify its production of offspring, for the chief criterion on which to base decisions in the planning of parenthood would be the welfare of the descendants themselves."

Current status of information on the induction of mutations by irradiation. H. M. Slatis. *Science* **121** (1955) pp. 817-821.

The new mutations induced by exposure of the entire population to one *r* of irradiation would be less than a third, and perhaps only a hundredth as numerous as those now occurring spontaneously in each generation. The estimated irradiation received by the average American from nuclear explosions to date is only one-tenth of an *r*.

The author considers relevant experimental data and arrives at figures for upper and lower limits for the average number of deleterious mutations carried by the normal individual, the spontaneous mutation rate, and the effectiveness of radiation in producing mutations.

Even a doubling of the present human mutation rate would, in the opinion of the author, pose little or no problem to the life of the species. More serious, he suspects, are "some of our current dysgenic practices."

Mandibulo-facial dysostosis. P. A. Hunt and D. I. Smith. *Pediatrics* **15** (1955), pp. 195-199.

This is the first American case report of a facial defect previously described in Europe. The most striking features of the condition are a very wide mouth and wide eyes, accessory openings and lobes ("buds") in front of the ears, and under-development of the facial bones. It appears to result from defective development of the first "gill" arch early in embryonic life. This report is particularly interesting because one brother, one cousin, and four consecutive maternal antecedents showed an abortive form of the anomaly, expressed only as accessory ear buds.

Evidently such ear buds in normal people may mark them as carriers of a gene for mandibulo-facial dysostosis. But it is not known how often this gene produces the full defect instead of the ear buds, and some ear anomalies closely resembling this may have a different explanation.

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POPULATION

The future of Japan—Her population and natural resources. Koichi Aki. *Population Problems Series No. 11.* The Population Problems Research Council, The Mainichi Newspapers, 1955, 80 pp.

This is a realistic and somewhat pessimistic appraisal of the outlook for Japan. Industrial production in Japan has risen 70 per cent above the pre-war level (1937-1939). Also, partly at the cost of a heavy rise in abortions, birth rates in Japan are now lower than those in the United States. Also, by the increased use of fertilizers, food production has been stepped up tremendously. However, the population is still increasing rapidly because the death rate is well below the birth rate. There are marked limitations to the amount of continued increase in industrial and agricultural production. In the first instance, there are shortages of certain materials and skills; in the second instance there are limits to which food production can be increased in finite areas. Most serious of all is the shrinking opportunity for world trade.

Longevity of retired Army and Air Force Officers. C. A. McMahan, John K. Folger, and Thomas R. Ford. *Human Biology*, **27** (1955), pp. 125-137.

This article apparently was written primarily as an experiment in method. It was desired to test the feasibility of "computation of life expectancy after working life, that is, with measuring length of life in the retired status." (p. 125.) The subjects considered are about 10,000 United States Army and Air Force officers living in retirement between January 1, 1925 and December 31, 1948.

As for results, "age-specific [death] rates were higher at ages under 65 than were rates for corresponding ages among the white male population in 1939-1941. Above age 65, however, rates were lower for the retired officer population." (p. 134.) The authors state that the higher age-specific mortality of the retired officers than that of the general white male population at ages under 65 may arise partly from the average earlier period of reference for the retired officers (1925-1948 instead of 1939-1941) and partly from the fact that officers retiring at early ages tend to be a select group with reference to poor health.

The movement in favor of family limitation throughout the world (1945-1954). (Le Mouvement Dans Le Monde En Faveur De La Limitation Des Families). Jean Sutter. *Population* **10** (1955), pp. 277-294.

The author performs the useful function of summarizing country by country the outstanding developments in the field of family limitation during the past decade. Attention is given not only to legislation and official and semi-official pronouncements by State and Church but also to important studies and conferences.

Of particular interest are the developments in certain Asiatic countries. China, being a Communist country is theoretically opposed to contraception. Yet, according to Sutter, in June, 1952, *The South China Daily* launched an appeal against infanticide; there were nearly, 2,000 cases in the rural areas of the province of Kouang-Tong. The September 18, 1954 issue of *Peiping People Daily* published a statement made by a Chinese deputy to the National Congress: "It is a good thing to have a large population, but it should be limited if the circumstances are unfavorable." [Reviewer's translation from the French].

Regarding India, Sutter mentions the experimentation with the safe period, which was directed by Dr. Abraham Stone, at the invitation of the World Health Organization and the Government of India. He cites Nehru's statement of July, 1951 on birth control: "In India, it has become an important problem. It seems clear that the State should encourage the planning of families." Sutter also describes the efforts of Mrs. D. Rama Rau in behalf of family limitation.

As for Japan, the author mentions the formation of the eugenics protection law in 1948 in which sterilizations and abortions were legalized for "eugenic" and "social" as well as for "medical" reasons. In 1952 it was made legal for doctors and midwives to instruct people in the use of contraceptives after fulfilling certain requirements.

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